Access DB# 11004

# SEARCH REQUEST FORM

**Scientific and Technical Information Center**

Requester's Full Name: ERICA CADUGAN Examiner #: 77259 Date: 1/13/04
Art Unit: 3722 Phone Number 30 8 6395 Serial Number: 09/987941
Mail Box and Bldg/Room Location: CP2/10/D30 Results Format Preferred (circle): PAPER DISK E-MAIL

**If more than one search is submitted, please prioritize searches in order of need.**

**********

Please provide a detailed statement of the search topic, and describe as specifically as possible the subject matter to be searched. Include the elected species or structures, keywords, synonyms, acronyms, and registry numbers, and combine with the concept or utility of the invention. Define any terms that may have a special meaning. Give examples or relevant citations, authors, etc, if known. Please attach a copy of the cover sheet, pertinent claims, and abstract.

Title of Invention: METHOD OF MILLING ENGINE BLOCKS

Inventors (please provide full names): DAHL, KATARINA
HESSMAN, INGEMAR

Earliest Priority Filing Date: 11/16/2001

**For Sequence Searches Only* Please include all pertinent information (parent, child, divisional, or issued patent numbers) along with the appropriate serial number.*

See ATTACHED

**********

| STAFF USE ONLY | Type of Search | Vendors and cost where applicable |
|---|---|---|
| Searcher: Emory Donovan | NA Sequence (#) | STN |
| Searcher Phone #: 305 8587 | AA Sequence (#) | Dialog ✓ 874.91 |
| Searcher Location: CP2 2C8 | Structure (#) | Questel/Orbit |
| Date Searcher Picked Up: 1/14/04 11:15 AM | Bibliographic ✓ | Dr.Link |
| Date Completed: 1/15/04 10AM | Litigation | Lexis/Nexis |
| Searcher Prep & Review Time: 220 min | Fulltext ✓ | Sequence Systems ✓ |
| Clerical Prep Time: 0 | Patent Family | WWW/Internet |
| Online Time: 270 min | Other | Other (specify) |

PTO-1590 (8-01)

C

# STIC Search Report
## EIC 3700

**STIC Database Tracking Number: 112023**

| | |
|---|---|
| **TO: Erica Cadugan**<br>**Location: cp2 10d30**<br>**Art Unit: 3722**<br>**Thursday, January 15, 2004**<br><br>**Case Serial Number: 09/987941** | **From: Emory Damron**<br>**Location: EIC 3700**<br>**CP2-2C08**<br>**Phone: 305-8587**<br><br>**Emory.Damron@uspto.gov** |

## Search Notes

Dear Erica,

Please find below an inventor search in the bibliographic and full-text foreign patent files, as well as keyword searches in the patent and non-patent literature files, both bibliographic and full text.
References of potential pertinence have been tagged, but please review all the packets in case you like something I didn't.
In addition to searching on Dialog, I also searched Scirus.com and EPO/JPO/Derwent.
I believe you'll find art of interest in all of the packets.
Please contact me if I can refocus or expand any aspect of this case.

Happy New Year!

Sincerely,
Emory Damron
Technical Information Specialist
EIC 3700, US Patent & Trademark Office
Phone: (703) 305-8587/ Fax: (703) 306-5915
Emory.damron@uspto.gov

```
Set     Items   Description
S1     909604   DRY OR NONLUBRIC? OR UNLUBRIC? OR (NON OR UN)()LUBRIC? OR -
             WITHOUT(3N)(CUTTING OR MACHIN? OR MILLING)()(FLUID? OR LIQUID?
              OR OIL OR OILS OR LUBRICA?)
S2    1953607   MILLING OR BLUEPRINTING OR BLUE()PRINTING OR MACHINING OR -
             CUTTING
S3         22   DRYMILL? OR DRYMACHIN? OR DRYCUT?
S4       7612   (SILICO? OR SILICA? OR SILICI?)(2N)NITRID? OR SI3N4 OR SI(-
             )3()N()4 OR SI3()N4
S5      89573   (CUT OR CUTS OR CUTTER? OR CUTTING OR MILLING OR MACHINING-
             )(3N)(TOOL? OR INSERT? OR BIT OR BITS)
S6          0   IC=(B23C? OR B23B?)
S7    1539837   IRON?
S8        472   CASTIRON?
S9     182757   ALUMINIUM???
S10    521508   ALUMINUM???
S11   1822697   AL
S12    197075   FE
S13     66229   FERROUS
S14      2319   S1(3N)S2 OR S3
S15         7   S14 AND S4(5N)S5
S16        33   S14 AND S4 AND S5 AND S7:S13
S17        33   S15:S16
S18        25   RD (unique items)
? show files
File   9:Business & Industry(R) Jul/1994-2004/Jan 14
         (c) 2004 Resp. DB Svcs.
File  15:ABI/Inform(R) 1971-2004/Jan 14
         (c) 2004 ProQuest Info&Learning
File  16:Gale Group PROMT(R) 1990-2004/Jan 15
         (c) 2004 The Gale Group
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         (c) 2004 The Gale group
File  80:TGG Aerospace/Def.Mkts(R) 1986-2004/Jan 15
         (c) 2004 The Gale Group
File 141:Readers Guide 1983-2003/Nov
         (c) 2003 The HW Wilson Co
File 148:Gale Group Trade & Industry DB 1976-2004/Jan 15
         (c)2004 The Gale Group
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File 482:Newsweek 2000-2004/Jan 14
         (c) 2004 Newsweek, Inc.
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         (c) 2004 The Gale Group
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         (c) 2004 ProQuest
File 635:Business Dateline(R) 1985-2004/Jan 14
         (c) 2004 ProQuest Info&Learning
File 636:Gale Group Newsletter DB(TM) 1987-2004/Jan 15
         (c) 2004 The Gale Group
File 646:Consumer Reports 1982-2004/Jan
         (c) 2004 Consumer Union
File 609:Bridge World Markets 2000-2001/Oct 01
         (c) 2001 Bridge
File 649:Gale Group Newswire ASAP(TM) 2004/Jan 06
         (c) 2004 The Gale Group
File 610:Business Wire 1999-2004/Jan 15
         (c) 2004 Business Wire.
File 613:PR Newswire 1999-2004/Jan 15
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(c) 2004 PR Newswire Association Inc
File 810:Business Wire 1986-1999/Feb 28
(c) 1999 Business Wire
File 813:PR Newswire 1987-1999/Apr 30
(c) 1999 PR Newswire Association Inc
File 20:Dialog Global Reporter 1997-2004/Jan 15
(c) 2004 The Dialog Corp.
File 570:Gale Group MARS(R) 1984-2004/Jan 15
(c) 2004 The Gale Group
File 476:Financial Times Fulltext 1982-2004/Jan 15
(c) 2004 Financial Times Ltd
File 477:Irish Times 1999-2004/Jan 14
(c) 2004 Irish Times
File 710:Times/Sun.Times(London) Jun 1988-2004/Jan 14
(c) 2004 Times Newspapers
File 711:Independent(London) Sep 1988-2004/Jan 14
(c) 2004 Newspaper Publ. PLC
File 756:Daily/Sunday Telegraph 2000-2004/Jan 15
(c) 2004 Telegraph Group
File 757:Mirror Publications/Independent Newspapers 2000-2004/Jan 15
(c) 2004

18/5,K/1 (Item 1 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)


02441232 181626121
**USE FORMAT 9 FOR FULL TEXT**
Cutting tools **101**
Destefani, Jim
Manufacturing Engineering v129n3 PP: 57-69 Sep 2002 CODEN: MAENDQ
ISSN: 0361-0853 JRNL CODE: MFE
DOC TYPE: Periodical; Cover Story LANGUAGE: English RECORD TYPE: Fulltext
LENGTH: 11 Pages
SPECIAL FEATURE: Photograph Table
WORD COUNT: 3568

ABSTRACT: As a critical part of the overall **machining** system, **cutting tools** are often targeted when manufacturers look for improvements in overall productivity. Technologies such as high-speed **machining** , **dry machining** , and continuing development of tough workpiece materials place extreme demands on **cutting tools** . To keep pace, tool suppliers must continue to develop products that can perform at higher speeds and last longer under increasingly rigorous operating conditions. A recent development in HSS tools is use of power metallurgy processing. Uniform distribution of carbides in P/M Hss provided benefits in both processing and tool performance.
GEOGRAPHIC NAMES: United States; US

DESCRIPTORS: **Cutting tools** ; Product design
CLASSIFICATION CODES: 9190 (CN=United States); 8670 (CN=Machinery industry)
PRINT MEDIA ID: 28353

Cutting tools **101**

ABSTRACT: As a critical part of the overall **machining** system, **cutting tools** are often targeted when manufacturers look for improvements in overall productivity. Technologies such as high-speed **machining** , **dry machining** , and continuing development of tough workpiece materials place extreme demands on **cutting tools** . To keep pace, tool suppliers must continue to develop products that can perform at higher...
TEXT: **CUTTING TOOLS**

Part 1 of our series focuses on **cutting tool** materials technology

Editor's Note: This article is the first installment of a three-part series covering the basics of **cutting tool** technology. Parts 2 and 3 will cover **cutting tool** coatings and geometries, respectively.

Sumitomo Electric Carbide

As a critical part of the overall **machining** system, **cutting tools** are often targeted when manufacturers look for improvements in overall productivity. Technologies such as high-speed **machining** , **dry machining** , and continuing development of tough workpiece materials place extreme demands on **cutting tools** . To keep pace, tool suppliers must continue to develop products that can perform at higher...

...rigorous operating conditions.

Higher speeds and metal removal rates generate increased heat. As a result,

**cutting** **tool** suppliers have placed heavy emphasis on development of heat-resistant tool materials. The result has...
...steel (HSS) tools to cemented carbides, cermets, ceramics, and superhard materials.

Regardless of material, all **cutting** **tools** have a defined working life. Aside from breakage, **cutting** **tools** wear in many ways, including:

Edge and flank wear

Cratering or top wear

Chipping

Built...

... stringy chips, such as many steels. If the crater grows large enough to contact the **cutting** edge, the **tool** will fail immediately.

Edge chipping is an unpredictable form of failure that sometimes begins when...

... with it. BUE is a common problem when machining ductile materials such as soft steels, **aluminum** , and copper alloys.
Tool deformation is a result of heat buildup. It can be minimized...

... than the carbon steel tools they replaced. Developed beginning around 1900, HSSs are heavily alloyed **ferrous** materials that can be divided into three main categories: tungsten, molybdenum, and molybdenum-cobalt based...

... Cobalt works a little differently than the carbide-forming alloying elements, dissolving to substitute for **iron** atoms in the matrix.

A relatively recent development in HSS tools is use of powder...

...use of higher cutting feeds and speeds than conventional HSS.

Applications for P/M HSS **tools** include drilling and **milling** operations where carbide **tools** chip, crack, or fail because of interrupted cuts or hard spots. Milling cutters are a...

...very complicated forms.

Between HSS and carbides in terms of properties is a class of **cutting** **tool** materials based on cast cobalt alloys. Development of these materials started in the early decades...produce inserts or solids used to create round tools.

Cemented carbides are the most common **cutting** **tool** materials currently in use. The chief advantage of carbide versus HSS is ability to cut at higher speeds: carbide **tools** **cut** 3-5 times faster than HSS.

Carbide has essentially replaced HSS in many applications, and is now the material of choice for more than half of all **cutting** **tools** produced worldwide. HSS accounts for about 40%; the remaining 10% or so are made up ...

... of application, the materials have a combination of properties that allow them to excel as **cutting** **tool** materials. These include:

Exceptional resistance to abrasion

High modules of elasticity

Chemical inertness

Torsional strength...
...that of HSS

Compressive strength

Toughness and resistance to impact

Wear resistance.

Development in carbide **cutting - tool** materials continues to yield new grades with application-specific combinations of properties. Technologies driving material...

... high compressive strength is important for machining materials that impose extremely high pressure on the **tool cutting** edge, such as superalloys.

Now researchers are exploring the potential benefits of "nano-phase" carbides...

...exotic materials.

Use of different types of carbides with a variety of properties also allows **cutting tool** manufacturers to tailor tool materials. Additions of titanium carbide, tantalum carbide, and niobium carbide are...

...only in insert corners.

Increasing the concentration of cobalt binder at the surface of carbide **cutting tools** improves toughness there while maintaining hardness and wear resistance in other areas. Cobalt enrichment is...

... as stainless and heat-resistant alloys; and K for short-chipping materials such as cast **irons** , hardened steels, and many nonferrous materials. These designations combine these letters with numbers indicating the cost, **machining** times, **tool** life, and other process parameters.

Cermets are essentially cemented carbides that use hard particles other...

... cutting applications, such as semi-finish and finish milling, in a variety of materials. Cermet **cutting tools** can handle high **cutting** speeds with moderate feeds and deep, consistent cutting depths. Tough cermet grades designed for milling...

...and increasing toughness.
Ceramics are hard and nonreactive-two properties that make them attractive as **cutting tool** materials. This combination of hardness-even at extreme temperatures-and chemical inertness means that ceramics...

... at high cutting speeds with very high metal removal rates in the right application.

Ceramic **cutting tools** have found application principally in turning and milling cast **irons** and superalloys and in finishing hardened steels.

These are applications where ceramics based on **aluminum** oxide ( **Al**

sub 2

O

sub 3

) and **silicon** **nitride** (Si

sub 3

N
sub 4

) can significantly outperform carbide tools.

The key to successful application of ceramic **cutting** **tools** is to remember that they can take far more heat than carbides-they soften at...

...18000E Cutting speed generates the heat needed for ceramic tools to work properly.

Alumina-based **cutting** **tool** compositions include additions of zirconia (ZrO

sub 2

), titanium carbide,. titanium **nitride** , or **silicon** carbide (SiC) whiskers. Alumina-zirconia ("white ceramic") contains up to 10% ZrO

sub 2

for...
...up to 40% TiC is especially abrasion-resistant and is used for machining chilled cast **irons** and hardened steels.

Alumina reinforced with SiC whiskers is the toughest and most resistant to thermal shock of the **Al**

sub 2

O

sub 3

-based ceramics. Unlike other such materials, it can be run...

...High-speed finishing of nickel-base superalloys is a typical application for whisker-reinforced ceramic **cutting** **tools** .

The whiskers improve properties by essentially locking into the ceramic matrix, and by virtue of...

... to a variety of workpiece materials over a hardness range of about RC 50-65.
**Cutting** **tool** materials based on **silicon** **nitride** include fully dense Si

sub 3

N

sub 4

and SiAlON materials, which are solid...

... good thermal shock resistance. Tools made with this material are excellent for turning gray cast **iron** , and are also used for milling and other interrupted-cut operations on gray **iron** . Coolant can be used for turning applications.

SiAlONs are typically more chemically stable than Si...

... be minimized by coating SiAlON tools with TiN or another coating material.

Development of superhard **cutting tool** materials began in the early 1970s with introduction of polycrystalline diamond (PCD) **cutting tool** materials. PCD **tools** consist of micron-sized diamonds in a carbide substrate. The abrasion-resistant diamond, coupled with...

... strong carbide, produces a tool material with significant performance benefits when used to machine copper, **aluminum** , composite materials, and nonmetallics. PCD can approach the toughness of some WC grades, making it suitable for milling and other interrupted cutting operations.

Strong silicon carbide whiskers (left) improve **aluminum** oxide properties by essentially locking into the ceramic matrix. Once in place, the whiskers are...

...to pull out of the matrix.

Today, many types of diamond materials are available for **cutting tool** applications. These include diamond coatings deposited by various methods, as well as thick-film diamond...

...process similar to that used to produce PCD tools.

Originally developed for hard turning of **ferrous** workpieces, CBN grades are now capable of handling a wide variety of operations, including milling ...

...two to three times that of PCD in some applications.

The chief limitation of diamond **cutting tool** materials-- whether PCD or thick-film-is their inability to machine **ferrous** alloys. Caused by a chemical reaction between the tool and the work material, this limitation led to development of the other main class of superhard **cutting tool** materials, cubic boron nitride (CBN). CBN tool use is currently growing at a rate of...

... PCD tools, except CBN crystals replace the diamond. CBN is used for machining very hard **ferrous** materials such as hardened die materials, alloy steels, and hardfacing metals. It is thermally stable...

... widely accepted, demand for application-specific grades has grown. This is most evident in CBN **cutting tool** materials, and development of new grades is expected to continue over the next several years...

... of CBN to binder material, and to increase productivity 30-50% versus existing grades.
Superhard **cutting tools** have coupled with developments in machine tool technology to constantly push machining speeds to higher...

... CBN have reached cutting speeds in the 300 m/min range, and surface milling of **aluminum** alloys using PCD tools has reached speeds of 4000 m/min.

WANT MORE INFORMATION?

**Cutting tool** -related product offerings from the Society of Manufacturing Engineers include video and CD-ROM offerings covering **cutting tool** materials and geometries. The presentations are part of SME's "Fundamental Manufacturing Processes" series, which...

DESCRIPTORS: **Cutting tools** ;

**18/5,K/2 (Item 2 from file: 15)**
DIALOG(R)File 15:ABI/Inform(R)


01852143 05-03135
**USE FORMAT 9 FOR FULL TEXT** Located at

**Ceramics: A tool material worth trying**

Aronson, Robert B

Manufacturing Engineering v123n1 PP: 66-71 Jul 1999 CODEN: MAENDQ
ISSN: 0361-0853 JRNL CODE: MFE
DOC TYPE: Journal article LANGUAGE: English LENGTH: 5 Pages.
WORD COUNT: 1625

ABSTRACT: Ceramic inserts are among the most important tools used to machine the current crop of high-strength, highly abrasive materials. Some manufacturers see them taking over many cutting chores from the long-established carbides. Chief benefits of ceramic **cutting tools** include: high hot hardness, low reactivity with the workpiece, long life, and high metal removal rates. Several major **tool** manufacturers - Greenleaf, NTK **Cutting Tools** , Sandvik and Carboloy - evaluated these **cutting tools** . Their views are presented.

GEOGRAPHIC NAMES: US

DESCRIPTORS: **Cutting tools** ; Ceramics; Machine tool industry; Manycompanies; Perceptions
CLASSIFICATION CODES: 8670 (CN=Machinery industry); 9190 (CN=United States)

...ABSTRACT: them taking over many cutting chores from the long-established carbides. Chief benefits of ceramic **cutting tools** include: high hot hardness, low reactivity with the workpiece, long life, and high metal removal rates. Several major **tool** manufacturers - Greenleaf, NTK **Cutting Tools** , Sandvik and Carboloy - evaluated these **cutting tools** . Their views are presented.
...TEXT: them taking over many cutting chores from the long-established carbides. Chief benefits of ceramic **cutting tools** include: high hot hardness, low reactivity with the workpiece, long life, and high metal removal rates.

Here's a look at what several major tool manufacturers think of these **cutting tools** .

Greenleaf Sagertown, PA

Keith Smith, International Manager

General. In the leap-frog race between materials...
...more impact resistance and better wear properties.

Coatings. Not too much is happening beyond coated **silicon nitride** . But coatings are not popular on ceramics because they're not needed. At this point...

... high speed. Positive rake and elaborate chip control are not needed in ceramic technology.

NTK **Cutting Tools** Farmington Hills, MI Neal Buschmohle, Assistant General Manager

General For ceramics, the future is bright...

... 609-914 nm/min) range and testing at 5000 sfm (1524 m/min). Only advanced **cutting - tool** materials can handle that speed and give a surface finish of 10 to 20 rms...

... has much more difficult disposal problems and more stringent antipollution laws, is pushing for more **dry machining** to eliminate coolant and lubricant-disposal problems. Because of that trend, ceramics, which can more...
... cost is high and usually doesn't justify the end result. We have three coated **silicon nitrides** that offer improved wear resistance. The trick is getting them to adhere at high speeds...

...smaller shops into using more ceramic tools.

We predict ceramics will lead the growth in **cutting tools** , followed by CBN. This growth is prompted by the need for higher removal rates on...

...has five times the surface cutting speed of carbide and it's tailored to machining **ironcobalt** metals such as Inconel and Waspaloy. However, it doesn't have much shock resistance.

In...

... we are testing a 1690 formulation that will be used primarily for turning gray cast **iron** . It has the wiper geometry initially designed for carbide inserts. A blended radius edge cuts...

...machined surface with a burnishing action.

We have some new ceramic formulations such as a **silicon nitride** that can run at twice the speed and feed ...Detroit, MI

Don Graham, Manager of Turning Programs

General. Among the major advantages of ceramic **cutting tools** is chemical stability; ceramic won't react with the material it's cutting. In some...

... are not metal-limited. But ceramics should not be applied universally. For copper, brass, and **aluminum** , for example, you have trouble with built-up edge. With the majority of **ferrous** materials, including superalloys, ceramics are suitable.

The downside to these ceramic materials is a slightly...

...are moving away from that.

There are two basic kinds of ceramics. First we have **aluminum** oxide. It is wear-resistant but brittle, and used chiefly on hardened steel. There are indications that **aluminum** -oxide-based ceramics are being displaced by CBN. The other major type is **silicon nitride** . Relatively soft and tough, it's used on cast **irons** .
Between the **aluminum** oxide and **silicon nitride** are a whole host of ceramic materials called Si-Alons that combine the two. The more **aluminum** oxide, the harder the material. The more **silicon nitride** , the tougher it is.

There are a number of materials that are technically ceramics, but...

...knowledgeable about applying this material.

Composites, those with silicon carbide whiskers, give great toughness to **aluminum** -oxide-based ceramic.

Coatings. They are new in terms of application, but not technology. For...

...they've been used to protect whisker-reinforced ceramics or increase the surface hardness of **silicon - nitride** ceramics.

It's the job of PVD and TiN coatings to tell what corner of...

...money.

There has been a major shift to harder materials. We used to machine gray **iron** , soft **aluminum** , and stainless steel. Now it's ductile **iron** , silicon- **aluminum** , and superalloys. In addition, we are constantly moving

to more abrasive material, and that means...

DESCRIPTORS: **Cutting tools** ;

18/5,K/3 (Item 3 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)


01852140 05-03132
**USE FORMAT 9 FOR FULL TEXT**

**Fitting the tool to the job**

Hogan, Brian J

Manufacturing Engineering v123n1 PP: 42-50 Jul 1999 CODEN: MAENDQ
ISSN: 0361-0853 JRNL CODE: MFE
DOC TYPE: Journal article LANGUAGE: English LENGTH: 6 Pages
WORD COUNT: 3244

ABSTRACT: The combination of high spindle speed, high feed, and advanced control software has captured the attention of the manufacturing community. Operating at high speed places new burdens on **inserts** and solid **tools** . **Cutting tool** manufacturers and designers must deal with the demands of high-speed cutting, or the process cannot advance. According to Rafi Wertheim of Iscar Ltd., the design of **cutting tools** for high-speed **machining** is difficult because everything must be right: material, cutting edge design, clamping design, and holding of the tool in the machine. All the features must fit together. Design considerations for high speed **cutting tools** are discussed.

GEOGRAPHIC NAMES: US
DESCRIPTORS: **Cutting tools** ; Design engineering; Specifications; Selection
CLASSIFICATION CODES: 7500 (CN=Product planning & development); 8670 (CN=Machinery industry); 9190 (CN=United States)

...ABSTRACT: captured the attention of the manufacturing community. Operating at high speed places new burdens on **inserts** and solid **tools** . **Cutting tool** manufacturers and designers must deal with the demands of high-speed cutting, or the process cannot advance. According to Rafi Wertheim of Iscar Ltd., the design of **cutting tools** for high-speed **machining** is difficult because everything must be right: material, cutting edge design, clamping design, and holding...

... tool in the machine. All the features must fit together. Design considerations for high speed **cutting tools** are discussed.
TEXT: Headnote:

High-speed

**machining**

requires **tool**
makers to

examine their

coatings, tool

design, and

substrate

material

(Photograph Omitted)

Captioned as: Valenite's new M100 button insert copy and face mill is shown **milling tool** steel.

The M100 features positive insert geometry and radically negative **insert** locations

that reduce **cutting** forces and allow smoother cuts at higher feeds. Whether we call it high-speed machining...

... role in the success of this manufacturing process, let's not lose sight of the **cutting tool** itself.

Operating at high speed places new burdens on inserts and solid tools. Tool manufacturers...

...clamp either by friction or by the resiliency of the clamping device. To secure the **inserts** in these **cutters** , you must use an additional clamping element, or use some very high-force clamping system...

...time to penetrate into the workpiece. A similar phenomenon occurs during high-speed machining." Machining **aluminum** is an ideal application for highspeed machining, because the soft metal doesn't geneT ate...

... carbide, in Wertheim's view, if the machine is stable. In high-speed machining of **aluminum** , companies look for excellent surface quality, which is best achieved by using PCD.

" **Silicon nitride** can also be used at high cutting speeds," says Wertheim, "mainly to machine cast **iron** . When I made a test with SiN a few years ago," he explains, "I used...

...life with SiN was only two minutes, but you can machine a piece of cast **iron** in almost no time when you reach those cutting speeds.

"The design of **cutting tools** for high-speed **machining** is difficult because everything must be right: material, cutting edge design, clamping design, and holding...

... cutter design, becomes less important in high-speed work. Huston points out that the actual **cutting** force on **inserts** may end up in the single-digit pound/kilo range, while centrifugal force may reach...speed environment requires more attention to safety issues."

(Photograph Omitted)

Captioned as: Tooled with eight **silicon - nitride** ceramic Kyon 3500

inserts, a 4" 102-mm) diam Kennametal Hertel milling cut

ter mills a cast **iron** pump housing at 3000 fpm (914 m/min).
"In general, the coating is in some...

... a coating becomes almost essential," North states. "And it certainly encourages you to go to **Al** sub 2 O sub 3 as one of the coating's components."

At high temperatures, the chemical reaction between a metal chip and the **cutting tool** becomes more and more important as a wear mechanism.

Alumina is the best material available...

...Also, TiAlN resists oxidation better than TiN or TiCN."

Diamond coatings are very useful for **aluminum** machining, he explains, because at progressively higher speeds, the operation approaches the liquidus temperature. When machining **aluminum** , temperatures probably won't rise above 600oC. So diamond, which is not very stable chemically, works well either as PCD or a coating, even at very high speeds on **aluminum** or **aluminum** -silicon.

The metalcutting process can produce a thermal shock on tools, especially if the system...
... speeds encourage the use of cermets (mostly for cutting steels) and ceramics for machining cast **iron** and superalloys.

"The smaller the tool, the higher the spindle rpm needed to get correct...

... bench work by probably 60-70%. In the aircraft industry, Giles says aircraft manufacturers cut **aluminum** at 3000 fpm (914 m/min). "Today, we are probably cutting at double that speed...

...0.020" [0.51 mm] cut by 0.010" [0.25 mm] radial depth of **cut**, and getting a **tool** life of 11/2 hr. And that's dry."

(Photograph Omitted)

Captioned as: MiniChipper face...

...maximize produc

tivity.

In the future, Giles expects to see more diamond used in machining **aluminum** . For stainless steels, Inconel, titanium and other high temperature alloys, he expects industry to employ... coatings play an important role there. We've developed a composite oxide coating. It's **aluminum** -oxide zirconium-oxide. Zirconia has an order of magnitude lower thermal conductivity than **Al** sub 2 O sub 3 , so it's an even better protection for the substrate...

... now a minor factor. "When we talk high speed, usually we are talking about cutting **aluminum** . We're seeing more and materials such as hardened die steels and cast **iron** being milled at high speeds," says Reiterman. " **Aluminum** is a preferred indexable **insert** **cutter** body choice because it's light. But the chips produced when you cut cast **iron** at 10,000 ft/min [3048 m/min] can do horrible things to an **aluminum** cutter body. Because of these developments, we must concern ourselves with the cutter body materials, as well as cutting material, coatings, geometries, and interfaces." In ultra-high-speed **machining** , he expects **tool** manufacturers to turn to higher strength materials such as titanium to make cutter bodies.

An...

... components with thinner and thinner rib and flange sections. Tony Deeming, managing director of HydraMarwin **Cutting** **Tools** (Sheffield, UK), says that problems arising from component resonance caused by machining unsupported flanges and...

...and feed in proportion, feed per tooth stays constant.

Hydra-Marwin produces solid, brazed, and **inserted** carbide **milling cutters** from submicron grain, 10% cobalt cemented carbide material. It makes cutters as large as 25...

... Deeming, are designed with maximum core strength to ensure rigidity and reduce vibration. To machine **aluminum** alloys, Hydra-Marwin's designers use a high spiral angle of 40-750 and high...

...steel, Sandvik's CoroMill 390 end mill

demonstrates its high-speed capabilities.

Some high-speed **cutting tools** use through-coolant holes to deliver coolants to cutting edges. This approach can, however, produce insists. In extreme cases, high-speed **dry cutting** of die steel (Rc 65) can cause localized temperatures of 900 deg.C. Introducing TiAlN...
... s tool designers generally favor a harder coating that also provides a good thermal barrier. **Aluminum** oxide works well, as does TiAlN. They favor PVD coatings over CVD. To keep residual...

... tool design. "There's a safety consideration that must be designed into the machine and **cutting tools** . It's important that the **cutting tool** and machine **tool** suppliers work closely with the end user during the planning stage of the process."

(Photograph...

DESCRIPTORS: **Cutting tools** ;

18/5,K/4 (Item 4 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)


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**USE FORMAT 9 FOR FULL TEXT**

**Ceramics and CBN**
Schneider, Johannes
Manufacturing Engineering v122n1 PP: 66-73 Jan 1999 CODEN: MAENDQ
ISSN: 0361-0853 JRNL CODE: MFE
DOC TYPE: Journal article LANGUAGE: English LENGTH: 7 Pages
SPECIAL FEATURE: Charts
WORD COUNT: 2746

ABSTRACT: Ceramics' and cubic boron nitrides' (CBN) hardness, chemical stability, and high wear-resistance make the materials, even at elevated temperatures, well suited for high-speed and hard machining that can achieve significant reductions in production time and cost. The ability of ceramics and CBN to run **dry** also allows cleaner **machining** processes with reduced environmental and health impact - saving coolant, maintenance, and disposal costs. In the high-performance cutting of cast **iron** , nodular or ductile cast **iron** , and in the turning of hardened steel, the material enables productivity gains and cost efficiencies, which have resulted in recent market share gains by both ceramic and CBN **cutting tools** within the automotive industry.
GEOGRAPHIC NAMES: US

DESCRIPTORS: Automobile industry; **Cutting tools** ; Machine tool industry; Cost control; Pollution control
CLASSIFICATION CODES: 1540 (CN=Pollution control); 8670 (CN=Machinery industry); 8680 (CN=Transportation equipment industry); 5310 (CN=Production planning & control); 9190 (CN=United States)

...ABSTRACT: significant reductions in production time and cost. The ability of ceramics and CBN to run **dry** also allows cleaner **machining** processes with reduced environmental and health impact - saving coolant, maintenance, and disposal costs. In the high-performance cutting of cast **iron** , nodular or ductile cast **iron** , and in the turning of hardened steel, the material enables productivity gains and cost efficiencies, which have resulted in recent market share gains by both ceramic and CBN **cutting tools** within the automotive industry. ...
TEXT: Headnote:

For high-speed, **dry** , and hard **machining** , these **cutting tools** may prove the ideal solution

Ceramics' and cubic boron nitrides' (CBN) hardness, chemical stability, and ...

... significant reductions in production time and cost. The ability of ceramics and CBN to run **dry** also allows cleaner **machining** processes with reduced environmental and health impact-saving coolant, maintenance, and disposal costs. In the high-performance cutting of cast **iron** , nodular or ductile cast **iron** , and in the turning of hardened steel, the materials enable productivity gains and cost efficiencies, which have resulted in recent market share gains by both ceramic and CBN **cutting tools** within the automotive industry.

Alumina, zirconia, titanium carbide, titanium **nitride** and **silicon nitride** , represent the most important materials used to produce ceramic

cutting grades. Key stages of ceramics...

...resistance, and chemical stability. These attributes enable high cutting and machining speeds, as well as **dry machining** , because it's not necessary to reduce the temperatures prevailing on the cutting edge.

Unfortunately...

... that allow material properties to match the application. When used in machining, selecting appropriate ceramic **cutting** grades, indexable **inserts** , and type of tool depends on the material machined, the machining task, and the manufacturing...

...and the cutting conditions.

(Photograph Omitted)

Captioned as: High-speed turning of disk brakes using **silicon - nitride** ceramics, which are prized for such applications because of their high material hardness, resistance to...

...and wear, and chemical stability.

Many typical machining applications today use the grades based on **Al** sub 2 O sub 3 (including mixed ceramics and whisker-reinforced ceramics) and Si sub...

... today are mainly used in rough and finish turning, as well as grooving of cast **iron** (gray cast **iron** and nodular cast **iron** ), and in continuous cutting at high cutting speeds without the use of coolants.

Mixed ceramics...

...at high cutting speeds, hard-- turning of rolls made from hardened steel or chilled cast **iron** , and finish-turning of hardened steel, preferably in continuous cutting.

**Silicon nitrides** ' typical structure exhibits needle-like grains which are embedded in a highly temperature-resistant grain...

... optimized powder processing, and gas-sintering techniques will increase fracture toughness and high-temperature hardness.

**Silicon nitrides** are particularly suited for rough machining of cast **iron** materials, even under unfavorable cutting conditions, such as heavily interrupted cuts and varying depth of...
... turning operations, Si sub 3 N sub 4 also is used successfully for milling cast **iron** , even with positive tool geometries.

Coatings on ceramics and Si sub 3 N sub 4 primarily allow increasing the cutting material's wear-resistance. Classic coating materials include **Al** sub 2 O sub 3 TiC, and TiN, all applied using different coating thickness and...

...inserts more visible.

Coating Si sub 3 N sub 4 offers application benefits, especially if **Al** sub 2 O sub 3 is contained as one layer-for instance, in a multilayer... range of Si sub 3 N sub 4 applications to the turning of nodular cast **iron** .

Polycrystalline cubic boron nitrides stand out for their high material hardness, hot hardness, and resistance...

...resistance to abrasion. Grades offering high-CBN content are used mostly for machining chilled cast **iron** , sintered metals, hard coatings consisting of mechanically resistant material, and pearlitic cast **iron** . No general definition of the term "high-speed cutting" exists. Operations referred to as high...

... light of the manufacturing process and the materials machined. For turning and boring gray cast **iron** , cutting speeds of >=1000 m/min are considered high speed, and for drilling operations on gray cast **iron** , cutting at >=400 m/min is considered high speed. In contrast, cutting speeds of >=500...

... 80 m/min for turning nickel-based alloys with whisker-reinforced ceramics, rank as highspeed **cutting** .

**Dry machining** currently fuels the debate over coolant-based machining, which has significant ecological and economic drawbacks...

... the use of cooling lubricants should be minimized wherever feasible. Except for minimum quantity lubrication, **dry machining** is being considered for applications in which the machining process doesn't require coolants.

Because...
... their high hot hardness and low disposition to adhesion and diffusion, ceramic and CBN make **dry machining** more practical. In milling, coolants also cause an alternating thermal load on the cutting edge...

... it's best to eliminate cooling lubricants in high-speed machining operations that use rotating **tools** . Hard **machining** generally is performed without coolants.

Depending on the shape of the workpiece to be machined...

...their disposal.

Hard machining places high demands on the machine tool, the chucking system, the **tool** , and the **cutting** grade. The entire system must exhibit the accuracy and rigidity necessary for compliance with narrow...

...a hardness of up to Rc 64 is machined. Depending on the wear of the **tool** , and on the **cutting** parameters, the marginal zone close to the surface may be affected in the micrometer range...

...finishing, surface finishes of <=0.6 micron are achieved.
High-speed machining of gray cast **iron** and nodular cast **iron** does not pose any problems, and it has become a state-of-the-- art process...

... min, and are not limited by the cutting material itself, but instead by the prevailing **machining** conditions. The machine **tool** or the chucking device, and the geometry of the workpiece to be machined, frequently limit ...

...are used for highspeed finishing.

It's not possible to use CBN on every cast **iron** that can be machined

using **silicon nitrides** . Predictions of increases in cutting speeds, or further reductions of machining times compared to the use of **silicon nitrides** , often cannot be fulfilled. In the first place, the entire environment-including the machine tool...

... however, requires diligence to achieve economic benefits. Watch the degree of utilization of the indexable **inserts** -cost per individual **cutting** edge is higher by a factor of 10 compared to Si sub 3 N sub 4 .

Nodular graphite cast **iron** , compared to gray cast **iron** , exhibits higher material strength and ductility. Nodular graphite cast **iron** parts offer the same functionality as gray cast **iron** components, but allow a reduction in component mass. Machining these ferrite-containing cast- **iron** materials essentially depends on the structure, the type of machining, the temperatures produced in the...

... finish-turning and grooving, while mixed ceramics do a good job of fine finishing. TiN/ **Al** sub 2 O sub 3 coated **silicon nitrides** are the choice for rough machining, boring, and for turning in interrupted cuts. Compared to gray cast **iron** , lower cutting speeds are used for machining. The cutting speed used for turning in continuous...

...it may reach 800 m/min in interrupted cuts.

When used with powerful machine tools, **silicon nitrides** enable high cutting speeds (more than 800 m/min) and feeds (0.2-0.3 mm/m) when it comes to rough boring of holes in cast **iron** . This enables rough machining the holes within a very short time by using highly flexible single-spindle machine tools instead of multispindle "single-purpose machine **tools** ." This **machining** technology, however, also is used on normal machining centers. Due to the lower power offered...

... and thermal loads on tools. With their high fracture toughness and resistance to thermal shock, **silicon nitrides** are suitable for milling operations involving large chip cross sections and positive tool geometries.

Gray cast **iron** and nodular graphite cast **iron** are milled at cutting speeds of 500-800 m/min, or even faster than 1000...

... 3 N sub 4 ceramic drills represent one of the most recent developments in highspeed **machining** . Powerful machine **tools** with high spindle speeds are required to use such drills. Spindle speeds of 10,000...

... required. The benefits of solid ceramic drills include: high output per time unit; environmentally friendly **dry machining** ; short production and cycle times; high production achieved on single-spindle machine tools; and high...

...holes must be produced within a short time.

The use of ceramics for turning cast **iron** at high cutting and machining speeds is a state-of-the-- art process today. Over...

...drives to make full use of the potential offered by ceramic tools.
Drilling of cast **iron** materials using solid ceramic drills made of **silicon nitride** remains in its infancy. In this field, new machine tool and production concepts will produce...

... all cutting materials that resist high temperatures, but particularly

for ceramics and CBN used in **dry machining** . The trend toward using nearnet-shape technology, and the tendency to replace grinding operations by...

...operations, will open up new fields of application

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Ebersbach/Fils, Germany

...DESCRIPTORS: **Cutting tools** ;

18/5,K/5 (Item 5 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)


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**USE FORMAT 9 FOR FULL TEXT**

**Machining challenges**

Arnold, David B; Momper, Friedrich J

Manufacturing Engineering v119n5 PP: 62-68 Nov 1997 CODEN: MAENDQ
ISSN: 0361-0853 JRNL CODE: MFE
DOC TYPE: Journal article LANGUAGE: English LENGTH: 4 Pages
SPECIAL FEATURE: Charts Graphs
WORD COUNT: 2541

ABSTRACT: **Cutting tool** manufacturers continuously face the challenge of new work piece materials. It is important to know how work-piece material change influences tool wear and how this translates to general guidelines for **cutting tool** development. In addition, it is important to understand the basic techniques necessary for machining materials such as nodular cast **iron** , heat-resistant alloys, titanium alloys, and AlSi alloys. The goal of tool developments is to boost productivity and quality. The impact of high-performance **machining** on **cutting tool** materials will expedite the development of solid carbide end mills and drills with specifically engineered coatings as well as CBN **cutting tools** and end mills. These tools will also encourage the development of system solutions that encompass chucks, balanced tools, vibration control, and special geometries.

DESCRIPTORS: **Cutting tools** ; Trends; Materials; Metals; Technological change
CLASSIFICATION CODES: 8660 (CN=Metalworking industry); 5310 (CN=Production planning & control); 5400 (CN=Research & development)

ABSTRACT: **Cutting tool** manufacturers continuously face the challenge of new work piece materials. It is important to know...

... work-piece material change influences tool wear and how this translates to general guidelines for **cutting tool** development. In addition, it is important to understand the basic techniques necessary for machining materials such as nodular cast **iron** , heat-resistant alloys, titanium alloys, and AlSi alloys. The goal of tool developments is to boost productivity and quality. The impact of high-performance **machining** on **cutting tool** materials will expedite the development of solid carbide end mills and drills with specifically engineered coatings as well as CBN **cutting tools** and end mills. These tools will also encourage the development of system solutions that encompass...
TEXT: Headnote:

Difficult-to-machine materials are the key to progress

**Cutting tool** manufacturers continuously face the challenge of new workpiece materials. For example, how do you reduce...

... how workpiece material change influences tool wear and how this translates to general guidelines for **cutting tool** development. In addition, it important to understand the basic techniques necessary for machining materials such as nodular cast **iron** , heat-resistant alloys, titanium alloys and AlSi alloys.

There are many ways to look at...

...factors acting in the metalcutting process. They include:

Workpiece material bulk, surface properties, and shape

**Cutting tool** material and geometry

**Cutting** conditions, including cutting parameters and coolant application
Machine tool rigidity, maximum rpm, and horsepower

Material...

... auto industry gives it great influence over workpiece material selection. In the past, gray cast **iron** and alloyed steel were that industry's chief materials. Today, we see partial replacement of gray cast **iron** in cylinder blocks and heads, housings, fixtures, and brake disks with **aluminum** , nodular cast **irons** , and compacted cast **irons** .

Steel. Still an important material in the automotive industry, this metal is being applied in...

... preformed or premachined before they receive their final shape at an automotive plant.

Gray cast **irons** . A material now widely used in the automotive industry, it's important for engine blocks...

... and housings. With competitive pressure from alternative workpiece materials, increasing the development of gray cast **iron** for parts such as brake disks is moving towards modified cast **irons** with high carbon content or inclusions of niobium carbides.

The controlled foundry process also allows...

... thin walls, which are difficult to machine to tight tolerances such as piston bore diameters.

**Al** sub2 O sub3 coated carbide tool grades are applied for general use. On the other hand, uncoated and coated **silicon nitride cutting tools** dominate the high-performance end of gray cast **iron** machining. They typically offer metal removal rates at least three times higher than coated carbide grades.

Nodular cast **irons** , such as GGG 40, GGG 50 and GGG 60, have become popular for parts such...

... wheel parts, crankshafts, and camshafts. These metals offer higher strength and toughness than other cast **irons** , a result of spherical inclusions of carbon in the metal matrix. Generally easy-to-machine, GGG 40 **irons** with higher ferrite content tend to produce built-up edges on the **cutting tool** . For materials such as GGG 60 and higher, abrasiveness increases as the pearlite content increases...
...as: Dry turning capabilities.

(Table Omitted)

Captioned as: Workpiece Material Trends-Automotive Industry

These nodular **iron** grades present unique machining characteristics. But

machinists often face inconsistencies within the workpiece microstructure and significant changes in machinability. The growing use of nodular cast **irons** , combined with customer needs for reliable and predictable results, initiated the development of a coated carbide grade tailored to nodular cast **iron** machining.

The basic requirements for the new **cutting tool** material for turning nodular **irons** were:

Resistance to adhesive and abrasive wear caused by the variable microstructures

Sufficient toughness to...

... consisted of a tungsten carbide (6% cobalt) substrate with a 12(mu)m thick TiCN/ **Al** sub2 O sub3 /TiN coating. The newly developed **cutting tool** combines a 6% cobalt substrate with a 10-(mu)m-thick, medium-temperature TiCN/ **Al** sub2 O sub3 /TiN coating. Mediumtemperature CVD TiCN coatings show a reduced tendency for the...

... in tool life. At higher speeds the TiCN coating softens and the effect of the **Al** sub2 O sub3 coating becomes predominant.

Performance improvements were not limited to wear resistance. In...

... higher toughness ratio. The overall performance of the newly developed grade exceeded expectations.

Recently developed **silicon nitride cutting tools** have a substantially improved fracture resistance. Due to their insufficient chemical wear resistance, however, they have a limited use in machining nodular cast **irons** , mainly in areas of severe cutting interruptions at higher speeds (>400 m/min). But when wear-resistant **Al** sub2 O sub3 coatings are applied to these tool materials, they can be used to machine high strength nodular cast **irons** .

Compacted cast **irons** . This new breed of material is for use in specific parts such as cylinder blocks for diesel engines or cast **iron** truck components. The graphite in these alloys is shaped like a coral, which results in higher toughness.

Although compacted cast **iron** is 30% lighter than gray cast **iron** , machining compacted cast **irons** is said to be more difficult than gray cast **irons** . Producing these components on present transfer lines could decrease output between 5 20 %, thereby erasing...

...the switch to the new workpiece material.

Presently, the producers of this material, customers, and **cutting tool** manufacturers are working to develop tools that will economically machine components made of compacted cast **irons** .

**Aluminum** alloys. A significant trend in automotive manufacturing with a major impact on **cutting tool** materials is the increasing utilization of **Al** alloys.

Forecasts for future cars predict the amount of **aluminum** will rise to between 10% and 20%. Engine blocks, cylinder heads, and housings will become major contributors to **aluminum** consumption. In brakes, disk rotors made of **aluminum** alloy with high silicon content may replace gray cast

**iron** .

Presently, uncoated carbides and polycrystalline diamond **cutting tools** dominate turning, **milling** , and drilling of AISi alloys. Uncoated carbides with sharp cutting edges and positive geometries are used for pure **aluminum** and softer **Al** alloys with less than 12% Si content, but smearing effects or edge build-up occur...

... Diamond-coated tools. Increased use of AlSi alloys also encouraged the development of diamond-coated **cutting tools** . They offer a higher wear resistance and multiple insert edges. Diamond-coated tools can also...

... make diamond-coated tools excellent candidates to replace uncoated carbides as well as expensive PCD **cutting tools** .

Adhesion of diamond coatings has always been an issue in their development. But adhesion has...

... 2400 sfm) are possible with these materials using existing uncoated and coated carbide and PCD **cutting tools** .
The major issue affecting broader use of these alloys is the relatively low ignition temperature...

...result is improved wear and chipping resistance. These coatings increase the speed capabilities of carbide **cutting tools** in titanium turning by a factor of two.

Demands for improved productivity in machining Ni...

... be improved by more than 40% compared to that attained with a presently used sialon **cutting tool** material.

Whisker-reinforced ceramics with 20% SiC whisker have proven their superior performance in turning...

... the manufacturing environment.Despite the name "hardened materials" are not necessarily that difficult to machine. **Cutting tool** materials like mixed ceramics or CBN **cutting tools** are already available for hard machining. To identify the proper **cutting tool** material, you must analyze the application.

In case of **cutting** interruptions, CBN **cutting tools** will be the appropriate choice. Continuous cuts allow the use of mixed ceramics or coatedmixed... demand to machine hardened workpieces as well as potential for use in machining of cast **irons** has driven efforts to find an economic and reliable way to deposit CBN coatings on different substrates.

**Dry machining** . The ultimate answer to cutting fluid and grinding sludge removal is **dry machining** , but this process can't be applied to every machining process and workpiece material.

Alternative coolants based on biologically recyclable ingredients, mistcooling systems, or cryogenic machining impose new challenges on **cutting tool** materials. In some cases, the appropriate **cutting tool** material selection, such as a thick **Al** sub2 O sub3 coated P-grade **inserts** for **machining** alloyed steel, can eliminate the need for cutting fluids.

In one example of successful dry turning, the operator used **Al** sub2 O sub3 , coated P-grade inserts. Increasing the feed rate from 0.34 to...

...the same number of parts could be machined with or without coolant.

While gray cast **iron** can be turned dry, heat-resistant alloys or stainless steel are very difficult to machine...

... these materials by using improved insert coatings and substrates or simply by selecting the proper **cutting tools** and **cutting** conditions.

Cooling fluids for drilling. Eliminating coolants can turn an easy-tomachine material into a difficult drilling problem, when using standard **cutting tools** . The introduction of TiAIN coatings represents a significant step towards dry drilling. In one experiment...

...TiAIN (3 rim) coated drills made 8.5-mm holes in an abrasive gray cast **iron** . A minimal coolant system, which sprays about 8 ml of cutting fluid per hour in...

...5-5 times better than the uncoated drill in this operation.

The goal in all **dry machining** is to develop **cutting tools** with higher resistance to thermal load and fatigue. Cermet tools may be one of the...

... the die and mold industry prove that hard milling of large molds using the appropriate **cutting tools** , such as ball-shaped CBNtipped mills can reduce manufacturing times by more than 80%. The...

...of the cermet tool also generates a smooth surface finish.

The impact of high-performance **machining** on **cutting tool** materials will expedite the development of solid carbide end mills and drills with specifically engineered coatings as well as CBN **cutting tools** and end mills. These tools will also encourage the development of system solutions that encompass...

DESCRIPTORS: **Cutting tools** ;

18/5,K/6 (Item 6 from file: 15)
DIALOG(R)File 15:ABI/Inform(R)


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**USE FORMAT 9 FOR FULL TEXT**

**Tools, workholding, and machine accessories**

Mason, Frederick

Manufacturing Engineering v117n2 PP: 148-190 Aug 1996 CODEN: MAENDQ
ISSN: 0361-0853 JRNL CODE: MFE
DOC TYPE: Journal article LANGUAGE: English LENGTH: 26 Pages
WORD COUNT: 6685

ABSTRACT: Faster cutting speeds to increase productivity have been the main trend in **cutting tool** development since high-speed steel tools replaced carbon steel tools at the start of the century, and they will continue as the main trend through century's end. According to Bernard North of Kennametal, several of the developments in **cutting tool** materials showgoers will see at the 1996 International Manufacturing Technology Show (IMTS) will give users real benefits only if they use the higher speeds. Since more metalcutting machine tools are now capable of higher speeds, the demand for advanced tool materials is only expanding. In round tools, solid carbide drills and end mills, commonly PVD coated, are continuing to displace HHS tools. Among carbide drills, more styles are becoming available with integral coolant holes for better chip flushing and cooling at higher speeds. New tools, workholding technologies, and machine accessories which will be on display at the 1996 IMTS are discussed.

GEOGRAPHIC NAMES: US

DESCRIPTORS: Machine tool industry; Industrial equipment; **Cutting tools** ; Technological change; Industrywide conditions; Manyproducts; Manycompanies
CLASSIFICATION CODES: 9190 (CN=United States); 8670 (CN=Machinery industry)

ABSTRACT: Faster cutting speeds to increase productivity have been the main trend in **cutting** tool development since high-speed steel tools replaced carbon steel tools at the start of the...

...through century's end. According to Bernard North of Kennametal, several of the developments in **cutting tool** materials showgoers will see at the 1996 International Manufacturing Technology Show (IMTS) will give users...
TEXT: Faster cutting speeds to increase productivity have been the main trend in **cutting tool** development since high-speed steel tools replaced carbon steel tools at the start of the...

...materials and process development at Kennametal (Latrobe, PA), says that several of the developments in **cutting tool** materials showgoers will see at IMTS 96 will give users real benefits only if they...

... chemical wear-resistance at high speeds and temperatures. Multilayer coatings have even been formulated for **silicon nitride** inserts, he says, to allow using them more widely. Long used effectively for running gray cast **iron** at high speeds, **silicon nitride** had not previously been effective on ductile **iron** because of crater wear from chips adhering to the inserts. The Kyon 3400 grade of multicoated **silicon nitride** resists crater wear when used for high-speed machining of ductile **iron** . And in the special niche of diamond coatings, North says that because of more production...

...in turning tools are multicorner CBN inserts with eight useable corners, for use on cast **iron** . They are more expensive than single-corner CBN inserts, but more economical on a cost...
... Despite this highpositive geometry, it is a general-purpose cutter, rather than one aimed at **aluminum** . Because it generates smaller bending forces than conventional cutters it is a good choice for today's lightweight #40 taper and smaller machining centers.

Also new in **milling tools** is a new ductile **iron** milling grade within the ISO K category. It has optimized the grade, edge prep, and medium-temperature-CVD coating for toughness, to deal with the greater strength of ductile **iron** compared to gray **iron** . Derek Giles of Carboloy, a Seco Tools Co., (Warren, MI) says that high-speed milling will reach 40,000 rpm. In addition to speed, the **milling tools** for the future must possess four additional requirements:

Versatility, so one cutter can perform more...

... expects that finish end milling cuts in the future will be made with carbide indexable **insert milling cutters** rather than HSS end mills.

Faster Holes

Guhring (Brookfield, WI) will exhibit some techniques for highspeed **dry machining** in conjunction with LeBlond Makino and Ingersoll Milling Machine Co., reports Paul Jacques. This is... a sample of the tools, workholding, and machine accessories that will be on display.

New **Tools** for **Milling** , Threading, and Turning

The Octomill face mill, a 45deg highshear, positive-negative cutter that generates...

... octagonal inserts, will be on exhibit. These inserts provide twice the edges of a square **insert** . The **cutter** will also ramp, slot, and plunge. Other new milling products include a copy milling line...

...cutters for high-feed-rate threading.

In turning, TX150, a new grade for turning ductile **iron** , now a popular automotive material, will also be on display.

Carboloy Inc. Circle 594

Turning and **Milling Inserts**

The T7000 grade of turning inserts has a 12-layer coating and extra-hard substrate...

... chip control over a wide range of depths of cut. The new "Metal Jack" steel **milling insert** has an angled chip groove with a raised back wall and scalloped back edge for...

...and rapid travel rates of 600 ipm (15 m/min).

Hause Machines Inc. Circle 776

**Cutting Tools**

Indexable **insert milling cutters** , end mills, five types of ball cutters, HSS and carbide end mills, and a variety...

... drills and taps from Vermont Tap and Die, and others, will be on display.

Universal **Cutting Tools** Circle 604

**Tooling** Column has Two Vises on Each Face
A four-sided ToolBlox steel workholding column, with...

...an effective way to handle a family of parts.

Kurt Mfg. Circle 589

Turning and **Milling Tools** and Software

On exhibit will be a comprehensive selection of **tools** for lathes and **machining** centers, as well as software for tool selection and electronic **tool** purchasing. **Milling tools** include RPF (ramp, plunge, face mill) cutters, Z-axis plunge cutters, and MCF-multiple choice... Designed especially for Bridgeporttype machines, its hold-down bolts are on 5" (123 mm) centers. **Aluminum** soft jaws that the operator can change in seconds are optional for holding special shapes...

...for long life and accuracy.

Buck Tool Co. Circle 944

Tools for High-Velocity Demo
**Cutting tools** with advanced materials and coatings will be used in the demonstration of the Ingersoll High Velocity Module. The tools will include soft-coated carbide drills for **dry** high-speed **machining** , cermet reamers, TiA1N-coated carbide drills, and SiN end mills. In addition, a full line...

... a recently introduced "button" style milling cutter that uses either double-positive or double-negative **inserts** in the same **cutter** body.

Ingersoll **Cutting Tools** . Circle 722

**Milling** and Workholding **Tools**

Dapra will feature the DynaShear line of **inserted** carbide **milling tools** , including ball-nose roughers and finishers, square-shoulder milling cutters, high-velocity milling cutters, and...

...uses small inserts having a variety of corner radii.

Kaiser Tool Co. Circle 602

Drilling, **Milling** , Turning, and Threading **Tools**
Unidrill is a line of indexable insert drills up to 4" (100-mm) diam. The ... in one pass at higher speeds than possible before. In addition, new cermet and carbide **cut** -off **tools** , some with plunge-andturn capability, will also be shown. Kyocera Industrial

Ceramics Corp. Circle 730...

...and designs, including a range of threaded designs.

Fairlane Products Inc. Circle 741

High-Speed **Toolholders**

For high-precision **machining** at speeds up to 30,000 rpm, the toolholders include HSK and V-flange lines. For **machining** center applications, the **toolholders** eliminate vibration, permitting faster metal removal, longer tool life, and use of carbide and cermet...

... complete line of machine accessories, including live and dead centers, collets, collet closers, CNC chucks, **milling** clamps, deburring **tools** , and air cleaning guns.
Royal Products Circle 951

Solid-Carbide Thread Mills

Multiflute solid-carbide...

...from 6X6" to 12X12" (152X152 mm to 305 X 305 mm). Made of 6061 T651 **aluminum** , plates are all 1/2" (12.7 mm) thick.

Jergens Circle 990

Angled Insert Blocks...

...high-performance finishing.

The manufacturer permanently marks all inserts with geometry and grade information with **cutting** data for each **insert** printed on the box. Inserts also are available in 2000series grades developed to cope with...mm to 1397 X 762 mm). The systems also come with a low profile, cast **iron** receiver, and a shuttle unit, which mounts to the plant floor in front of a ...
... because the relationship of the hooked tooth-face and supportfinger remains the same throughout the **tool** 's **cutting** length. This relationship assures full control over the primary relief angle.

The three-flute standard...

...customized.

Riten Industries Circle 956

Toolholders for High Speeds

Manufacturer will show four lines of **toolholders** for high-speed **machining** centers: mass symmetry **toolholders** , hydraulic grip end mill holders, HSK toolholders, and Urma modular boring systems. The Mass Symmetry...

...double-ended inserts.

Iscar Metals Inc. Circle 988

High-Velocity Milling Cutters
Mastermill high-velocity **aluminum** (HVA) milling cutters improve cutting performance when working with **aluminum** , other nonferrous metals, and nonmetallics.

The 7075-T6 **aluminum** bodies, hard coated to R sub c 60, handle speeds up to 13,500 rpm... are made of black ceramic to lengthen tool life. The company offers three grades of **silicon nitride** : SP2 wear-resistant ceramic for turning, SX8 for light interrupted cuts in turning and milling ...

...8 to 3/8" (3-10 mm) sizes to machine stainless and carbon steels.

NTK **Cutting Tools** Circle 1034

**Tool** Monitoring System

Monitor checks spindle power usage to detect worn or broken tools. Power consumption...

... in power consumption. Easy-to-use software lets the user establish monitor parameters for specific **machining** processes.
Techna- **Tool** & Machine Co. Circle 1036

Tooling Table Positions Manually

Hand-crank mechanical elevating table that will...

... good metal removal and chip-ejection qualities. It can cut a variety of steel and **aluminum** alloys.

Dijet Inc. Circle 1023

Double the Turbine Power

"X" series turbine has double turbine...

... at less than 78 dB. The constant speed also reduces vibration and enhances accuracy and **cutting tool** life. Oil-free operation eliminates oil contaminates from the workplace. Automatic brakes and deadman handles ...

...DESCRIPTORS: **Cutting tools** ;

18/5,K/13 (Item 5 from file: 16)
DIALOG(R)File 16:Gale Group PROMT(R)


07993383 Supplier Number: 62968113 (USE FORMAT 7 FOR FULLTEXT)
**AT THE CUTTING EDGE.**
Katz, R. Nathan
Ceramic Industry, v150, n4, p19
April, 2000
ISSN: 0009-0220
Language: English Record Type: Fulltext
Document Type: Magazine/Journal; Trade
Word Count: 947
PUBLISHER NAME: Business News Publishing Co.
INDUSTRY NAMES: BUSN (Any type of business); CHEM (Chemicals, Plastics and Rubber); ENG (Engineering and Manufacturing)

looked @

(USE FORMAT 7 FOR FULLTEXT)
TEXT:
While ceramic **cutting tools** have been in use for over 60 years, it is only within the past two decades that they have found major applications, principally in the turning and milling of cast **iron** , nickel based superalloys and the finishing of hardened steels. In these areas, ceramics based on **aluminum** oxide and **silicon nitride** are significantly outperforming cemented carbides and coated carbides. While the latter two materials contain significant...

...true ceramics. Similarly, sintered diamond and polycrystalline CBN can be considered ceramics, put within the **cutting tool** industry only the alumina and (Si.sub.3)(N.sub.4) based materials are refferred...

High speed **cutting tool** tips can encounter temperatures of 100(degrees)C or higher, so a key property for an efficient **cutting tool** is hot hardness. Both the alumina and (Si.sub.3)(N.sub.4) families of...

...run hotter and longer with less wear than the competing materials.

Historic concerns with ceramic **cutting tools** have focused on low toughness, susceptibility to thermal shock and unpredictable failure times. Improvements in...

...TiC, "black ceramic," is typically 30-40% TiC and is used for machining chilled cast **iron** and hardened steels. This material is particularly abrasion resistant. Alumina-(SiC.sub.W) reinforced composite...

...finishing of Ni-based superalloys is typically carried out using cooled alumina-(SiC.sub.W).

**Silicon Nitride** Based Tools

**Silicon nitride** based inserts include fully dense (Si.sub.3)(N.sub.4) (typically with yttria and...

...than 1,000 MPa) and a low thermal expansion that yields excellent thermal shock behavior. **Silicon nitride** is the most efficient insert for the turning of gray cast **iron** , and is also used for milling and other interrupted cut operations on gray **iron** . Because of its thermal shock resistance, coolant may be used with **silicon nitride** for turning applications. SiAlONs are typically more chemically stable than the (Si.sub.3)(N...

...in the interrupted single point turning of the outer diameter

counterweights on a gray cast **iron** crankshaft. This change resulted in the metal removal rate increasing by 150% and the tool...

...purchase a second machine tool.

Future Directions and Markets

Even with significant performance advantages, ceramic **cutting tools** have to struggle to maintain market share. Major markets for ceramic tools include automotive and aerospace manufacturers. As **aluminum** engine blocks and other components replace gray cast **iron** , there is less gray cast **iron** to machine. To compensate, alumina and TiN coated (Si.sub.3)(N.sub.4)s have been developed that outperform coated carbides in turning and milling of ductile **iron** , thus opening new markets. Similarly, nanosizecd additions of (ZrO.sub.2) into "white" ceramic tools...

...to $4 billion tool insert market. This (sim)$150 to $200 million market for ceramic **cutting tools** is expected remain at 5% of the total market for the near future. Further ahead, as environ mental regulations increase the disposal costs for **cutting** fluids, the **dry machining** ability of the ceramics may provide are opportunity to increase its percentage of the market...

18/5,K/17 (Item 2 from file: 148)
DIALOG(R)File 148:Gale Group Trade & Industry DB


15767301 SUPPLIER NUMBER: 93231489 (USE FORMAT 7 OR 9 FOR FULL TEXT)
**Inside economical milling: an expert looks at all the angels. (Cover Story).**
Wertheim, Dr. Rafi
Tooling & Production, 67, 6, 56(6)
Sept, 2001
ISSN: 0040-9243 LANGUAGE: English RECORD TYPE: Fulltext
WORD COUNT: 3622 LINE COUNT: 00290

INDUSTRY CODES/NAMES: BUSN Any type of business; METL Metals, Metalworking and Machinery
FILE SEGMENT: TI File 148

TEXT:

...and improvements of milling operations are characterized by various approaches, including the design of the **cutting tool** , its connection to the machine tool, the design of the insert geometry and the selection of the **cutting tool** material. In addition to the **tool** design and **machining** conditions, the use of high-speed **machining** , hard **milling** , **dry cutting** , high-performance **cutting** and other measures to improve performance can be mentioned. All of the above leads to...

The development of new **inserts** with more **cutting** edges, new **tool** geometries and new **cutting tool** materials leads to better efficiency, stability, accuracy and tool life. Using new tool-design methods...

...finite element modeling (FEM) enables the optimization of shape and application even before producing the **tools** themselves.

For economical **milling** , high-performance, all parts involved in the milling process should be selected and optimized. Not only the **milling tools** and connections to the machine tool, but also the machine tool itself, the workpiece material...clearance face--can improve performance in all industrial milling applications. In the past, simple flat **inserts** with straight **cutting** edges were used. Today, more cutting edges have a helical profile in order to improve accuracy, **tool** life, surface quality, **machining** stability and cost efficiency.

The use of standard positive flat SPKN, TPKN or SEKN inserts...

...tendencies. Older cutter types with wedge or top-clamped inserts have been replaced gradually by **cutters** with screw-clamped **inserts** with ... surface of the cutter and a plane which contains the cutting edge itself. When rotating **inserts** with this **cutting** edge around the center line of the cylinder, the resulting machined surface is flat and perpendicular to the frontal face. These inserts solve the main geometrical disadvantages of a straight- **cutting** -edge **insert** --the lack of workpiece side-wall straightness, flatness and perpendicularity. The inserts thus save additional...has a smaller insert wedge angle, but at the same time is subjected to lower **cutting** forces. The **inserts** are also equipped with wiper flats, which act on the frontal machined surface to improve...

...inserts for 90-degree shouldering, facing and slotting for improved economy and performance. These square **inserts** combine the helical **cutting** edge on all four edges with an additional wiper to perform for 90-degree sidewall **milling** operations. The typical **insert** designs ... the wiper area. The unique design with the wiper insures high-surface quality and stable **machining** .

The multipurpose **inserts** are clamped with a relatively large axial

angle on end mills, shoulder cutters, slotting cutters...

...using each of the four corners for machining flat, straight and perpendicular shoulders.

Clamping the **inserts** on heavy-duty **cutters** with multiple **inserts** provides full-effective helical cutting edges and the possibility to machine at large depths. The...

...QDMT or QPMT, mainly for machining shoulders, slots, and deep walls. Each of the new **inserts** with four helical **cutting** edges can be used for right-and left-hand milling directions, reducing stock requirements significantly. The **inserts** have reinforced **cutting** edges and cutting corners due to a unique corner design. Each corner is equipped with...mount the insert in a selected position on the cutter periphery being able to select **cutter** width. Square **inserts** are normally available in 6-, 10- and 16-mm square shapes and corner radii of...

...at right) offer eight cutting edges, each with 45-degree lead angles, for more economical **milling** applications.

**Inserts** combining helical **cutting** edges, a large axial angle, and a rib-type rake face design offer a self finishing. The sloped, unstraight **cutting** -edge **inserts** make it possible to use fine-pitch **cutters** with more **inserts** on the same body. This enables machining with higher loads and higher table feeds.

The...preferred geometry depends upon the workpiece material and application. The basic OFMT 07T3-AER-76 **insert** with its helical **cutting** edge, and a flat wiper on each corner, has a depression-style rake-face design...this wider wiper configuration is used on an octagonal cutter while all of the other **inserts** on the **cutter** have one of the other standard configurations.

For machining **aluminum** and similar soft materials, a ground octagonal insert type OFCR07T-AEN with high positive ...applications, especially in face machining of engine blocks and very large surfaces, new negative, octagonal **inserts** with 16 **cutting** edges, or a positive octagonal **insert** with eight **cutting** edges. have been developed.

High surface quality

In finish ...means from the frontal cutting edge and the corner design geometry, in combination with the **machining** conditions. Wiper **inserts** are used in order to save additional fine milling or grinding operations, saving cost as well as improving productivity and efficiency resulting in significant cost saving.

One of the **inserts** on the **cutter** for finishing applications (as seen in the accompanying photo) can be a wiper insert to...comparison with other options is shown below. In milling alloy steel with an 80-mm **cutter** diameter, with five **inserts** , at feet of 0.25mm/tooth and depth of cut varying between 0.5 to...On the other hand, there is no need and no advantage in using two wiper **inserts** in one **cutter** since similar roughness values as with one wiper insert were obtained. The resultant good surface...

...operations, improving the economy of milling operations.

Also, when using the ground OFCR 07T3-AEN **inserts** in finish **milling** soft materials like **aluminum** , stainless, and titanium a very high surface quality can be reached ranging between Rcla= 0...rigidity.

Recent research activities succeeded in developing the M1LL2000 tool system with high-strength helical **cutting** edge **inserts** . The **inserts** with an overall dovetail shape are safely screw clamped on the cutter body. The dovetail...mills

The development of ballnose-type end mills is characterized by the introduction of new **cutting** **tool** materials, new geometries, new

clamping systems and the use of simulation and evaluation methods like the FEA.

For economical profile **milling** various HSS, brazed **tools** , solid carbide and more and more indexable-insert end mills are used. Normally, up to...stability, and improve chip flow.

New end mills with larger diameters are equipped with helical **cutting** edge **inserts** , and unique chipformer geometries, as shown below. The frontal centerpoint is located in the center entrance and exit are smaller. Smaller-sized tools normally have a single **cutting** edge, and **tools** with larger diameters have two ground edges for balancing and high surface quality.

When a high superfinish surface quality is required, the two effective- **cutting** -edge **insert** (CRF) should be preferred. The cutting edges are ground, sharp, the rake face is positive...medium speeds, normally screw clamped or blade-type inserts can also be used.

Designing of **cutting tools** , **insert** geometry, clamping devices, and chip-formers has been achieved in the past using trial and...to the use of analytical models using FEA--finite element analysis--for the development of **milling tools** with optimal performance.

Solid carbide end mills

The development of sub-micron carbide substrates with...

...improvement and optimization of the new TiAIN PVD coating provides the optimal solution for hard **milling** , for **dry cutting** and for high-speed machining.

Therefore, almost all ...for finishing operations may be limited due to surface quality requirements, run-out of the **tools** , adjustment limitations, **cutting** edge configurations, and the very small ... Furthermore, when high side-wall flatness and accuracy is required, the use of extended flute **cutters** with multiple **inserts** is limited. In all of these cases, endmills, either solid or with single indexable inserts...

...dimensions.

New technologies

Economical and performance improvement in milling is possible also by using balanced **tools** which enable higher **machining** conditions and longer **tool** life. When combined with new adaptors or clamping systems which improve stiffness and rigidity of the **cutting tools** , higher feeds, larger depths of cut, and higher speeds can be used.

Recently, unique plunging...bending forces on the tool are decreased.

The shown tools are equipped with unique tangential **inserts** with four **cutting** edges. This strong, double-sided insert with a roof-type slope can be screw clamped...rates.

Cuts above others

High-speed machining (HSM), the machining of hardened steel (HC) or **dry cutting** (DC) are the main methods to improve overall cost efficiency and to fulfill various environmental...first of all, on the workpiece composition and properties. While cutting speeds for machining plastic, **aluminum** and other nonferrous materials reach today about 1,000 m/min, the use of high-speed cutting is aimed to reach more than 3,000 in/mm. Machining cast **iron** by using, for example, **silicon nitride** , reaches today nearly 1,000 in/ ...was done at very low speeds, can now be doubled or more by using new **cutting tool** materials under optimal **machining** conditions.

For high-speed face milling of **aluminum** and other soft materials new balanced cutters with high precision have been introduced.

The **inserts** , with two **cutting** edges and with very high positive rake angles, are available in uncoated carbide grade ...is achieved eliminating any additional finishing steps.

The development and introduction of new insert and **tool** geometries for economical **milling** is an on-going process improving performance, tool life, and surface quality. Iscar Ltd., Tefen...

18/5,K/22 (Item 7 from file: 148)
DIALOG(R)File 148:Gale Group Trade & Industry DB


looked

10420090 SUPPLIER NUMBER: 21060169 (USE FORMAT 7 OR 9 FOR FULL TEXT)
Dry machining - **a promising option. (includes related articles)**
Heine, Hans J.
Foundry Management & Technology, v126, n8, p44(3)
August, 1998
ISSN: 0360-8999 LANGUAGE: English RECORD TYPE: Fulltext; Abstract
WORD COUNT: 1775 LINE COUNT: 00153

ABSTRACT: A number of foundries and manufacturers of foundry equipment have begun to incorporate **dry machining** process in their operations. The process is environmental friendly and supports a high metal removable rate. It hones cutting edges to minimize cutting temperatures while integrating soft coatings to prevent edge buildup. **Dry machining** also increases **tool** life and enhances heat control. Some of the companies which have integrated **dry machining** in their operations are Buderus Guss GmbH, Breidenbach and Heidelberg Druckmaschinen AG.

SPECIAL FEATURES: photograph; illustration
INDUSTRY CODES/NAMES: BUSN Any type of business; METL Metals, Metalworking and Machinery
DESCRIPTORS: Machining--Technique; Founding--Technique
PRODUCT/INDUSTRY NAMES: 3320000 ( **Iron** & Steel Foundries)
SIC CODES: 3320 Iron and Steel Foundries
FILE SEGMENT: TI File 148

Dry machining - **a promising option. (includes related articles)**

ABSTRACT: A number of foundries and manufacturers of foundry equipment have begun to incorporate **dry machining** process in their operations. The process is environmental friendly and supports a high metal removable
...

...hones cutting edges to minimize cutting temperatures while integrating soft coatings to prevent edge buildup. **Dry machining** also increases **tool** life and enhances heat control. Some of the companies which have integrated **dry machining** in their operations are Buderus Guss GmbH, Breidenbach and Heidelberg Druckmaschinen AG.

In **dry machining** , the functions of coolants/lubricants must be assumed by some alternative means. The absence of...

...metal dust can damage the machine tool guideways.

The use of coolant/lubricants in machining **ferrous** and nonferrous components is increasingly viewed as undesirable for both economic and environmental reasons. Then...

...instance: for steel and its alloys, the a major factor is high temperature, for cast **irons** and **aluminum** with a high silicon content it is abrasive wear, and for other grades of **aluminum** in general it is the pronounced tendency to adhere, leading to buildup on tool and workpiece.

Design of the **tool** 's **cutting** edge has an influence on heat generation during machining without lubricant, and application of highly heat-resistant coatings such as titanium- **aluminum** -nitride (Ti **Al** N), for example, minimizes the effects of high temperatures on the tool. High-temperature wear resistance and hardness at elevated temperatures are prerequisites for **tools** used in **dry machining** : Cermets and ceramic

cutting materials should be used predominantly for good results.
However, the relatively...

...commercially available to prolong tool life, as has been documented in extensive laboratory tests. For **dry milling** of ductile **iron** (east **iron** where the graphite occurs in spheroidal shape), tool life is greatly enhanced, if **silicon nitride** ( **Si3N4** ) ceramics are employed and the cutting speed is increased at the same time. Then machining...

...used, but a cutting material of higher quality or an abrasion-resistant coating on the **cutting** edges can improve **tool** life in spite of the absence of a lubricant.
It is well known that lubricants...

...workpiece temperatures. The initial fears of many users that there would be serious increase in **tool** erosion during **dry machining** were not borne out when the new cutting materials were employed.
It is the consensus among tool producers that today's **cutting** materials often permit **dry machining** . However, the **cutting** conditions must be judiciously adapted: The metal removal rate should be high (to reduce to...

...exceptional hardness and thermal conductivity to different types of tools.
There are European companies where **dry machining** of gray **iron** components has been practiced successfully for a number of years. (Manufacture of brake drums at...

...GmbH, Breidenbach, and milling of printing press components at Heidelberg Druckmaschinen AG, Wiesloch, for example.) **Silicon nitride** , cutting ceramics, and cubic boron nitride (CBN) are the **tool** materials of choice. **Cutting** speeds between 600 and 1200 m/min are common.
According to traditional schoolbook information, lubricants...

...the lubricant and the prevention of built-up and burr formation edges, particularly when machining **aluminum** and copper alloy parts.
What to do in instances where it is impossible to machine...machines that automatically check temperature, dimensional deviation from the engineering drawing, and drift of the **tool** .
Vignettes on **Dry Machining**
**Dry machining** unburdens the environment. Today's **cutting** material frequently permit **dry machining** . However, **cutting** conditions have to be judiciously adapted: The metal removal rate should be high and contact...

...material machine and the specific application. A prerequisite, however, is the development of innovative reaming **tools** .
**Dry machining** of wrought **aluminum** alloys: Disposal costs for lubricants represent a considerable part of overall manufacturing costs. **Dry machining** not only reduces human health concerns and ecological burdens but also their costs.
Can one...

...of lubricant is applied directly to the point of contact between the workpiece and the **cutting tool** . This technology gives rise to substantial advantages, among them:
* Problem-free recycling of metal chips...

...which it is suitable.
With effective metering of the lubricant during its application to the

**tool** **cutting** edge or workpiece contact area, lubricoolant consumption can be reduced to between 10 and 100...

...contacting Jutta Wussow, Steidle GmbH, D-40764 Langenfeld, Germany. Fax: 011-49-2173-9102-49.

**Dry** High-Speed **Machining** 's 10 Commandments

1. Dry holemaking for total success. 2. Honed cutting edges to lower ...

...lubrication for machining economy and flexibility. 6. Internal mist lubrication to maximize productivity. 7. Custom **tool** geometries for reducing **cutting** friction. 8. Suction systems to evacuate mist, fumes, and chips. 9. New machine concepts for fast, effective hot chip removal. 10. Faster, not slower **cutting** rates to improve **tool** life and control heat.

PRODUCT/INDUSTRY NAMES: 3320000 ( **Iron** & Steel Foundries)

18/5,K/25 (Item 10 from file: 148)


04123573 SUPPLIER NUMBER: 08009713 (USE FORMAT 7 OR 9 FOR FULL TEXT)
**High-speed machining: where it's headed.**
Gallist, Rudolf
Modern Machine Shop, v62, n5, p66(13)
Oct, 1989
ISSN: 0026-8003 LANGUAGE: ENGLISH RECORD TYPE: FULLTEXT
WORD COUNT: 3453 LINE COUNT: 00270

CAPTIONS: Cross-section of a high-speed spindle. (chart); Ranges of feeds and speed for light metals. (graph); Economic advantages of high-speed machining. (graph); The effect of speed in reducing machining time. (chart) ; The effect of clearance angles on tool life. (graph)

SPECIAL FEATURES: illustration; photograph; chart; graph
INDUSTRY CODES/NAMES: METL Metals, Metalworking and Machinery
DESCRIPTORS: Composite materials--Machining; High-speed machining--Forecasts
SIC CODES: 3541 Machine tools, metal cutting types
FILE SEGMENT: TI File 148

... 25 to 30 percent by the turn of the century. These trends will affect machine **tools** , spindles, **cutting tools** , and the **machining** processes themselves.

Machine **Tools** and Spindles

Looking ahead, the following developments will come into prominence (Figure 1): * Dimensionally stable...

...with an adequate taper clamping force. * Taper location at the spindle nose for extremely efficient **cutting tool** stability and a repetitive accuracy of 0.002 mm (0.00008 inch) or less, with...

...all conditions that could affect spindle (such as lubrication, cooling, bearing load, and type of **cutting tool** ).

**Cutting Tools**

For wide acceptance of high-speed machining, the following issues will have to be addressed...

...diameters to 25 mm (one inch). * Spring/groove type locating and clamping systems for indexable **inserts** in counter-balanced **cutter** bodies up to 50 mm (about two inches) diameter. Excessive centrifugal forces make larger diameters impractical. * **Cutting tools** with special high-rake, high-clearance edge geometries for **machining** advanced composites. * **Cutting tools** with integrated coolant ducts.

The Machining Process

Use of high-speed spindles will also influence...

...what high-speed machining has to offer. * The establishment of automated processing routines that generate **milling tool** paths without sharp acceleration and deceleration steps along with appropriate chip removal parameters and the proper selection of **cutting tools** to suit the workpiece material. * Feedback sensing of excitation/vibration frequencies for adaptive control. * The...

...as compact units for high-speed machining. They can be installed on virtually any machine **tool** (Figure 3).

Available **cutting tool** materials, including uncoated and coated carbides, ceramics, **silicon nitrides** , CBN, and PCD, with the necessary cutting edge geometries, will now function at speeds as...

...certainly suitable for the application of high-speed spindles. These, in conjunction with the newer **cutting tool** materials, can speed recovery of the investment required for this advanced technology.

One major problem...m/min (6660 fpm).

Consider this example of what high-speed milling can do in **aluminum** . The **tool** is a carbide **milling** cutter, 16 mm (5/8 inch) diameter with two flutes. A groove 16 mm (5...

...the aircraft industry, have shown savings of 66 percent. The material normally machined was an **aluminum** alloy with high strength properties. With high-speed machining, a 50 percent cost savings would...

...is possible that the amount saved could exceed 50 percent with CBN, PCD, and ceramic **cutting tools** (Figure 5). In this figure, the reduced amortization cost is shown as a reduced charge...

...produced per hour.

Copper And Its Alloys

By using the same cutter geometry as for **aluminum** , copper materials can be machined efficiently with carbide tools, especially if they are equipped with...

...4 mm (0.008 and 0.016 inch). When machining the tougher copper alloys, the **cutting tools** should be lapped to avoid built-up edges, and the feed rate per tooth (fz...glass- and carbon-fiber-reinforced composites, satisfactory tool life rates are obtainable only with PCD **tools** . The **cutting** surface speed (Vc) should be in the range of 4500 m/min (15,000 sfpm...

...containment of carbon dust with a fluid shield, the use of sealed motor spindles and **cutting tools** with integral blow-out ducts is strongly recommended.

The quicker the fine graphite chips are...

...removal is rapid and thorough, an economically priced solid carbide end mill will do well.

**Cutting tools** made of sintered materials consisting of carbide and CBN are finding favor in machining graphite...

...1000 m/min (3330 spfm); feed rate (Vf) 4000 mm/min (160 ipm); down (climb) **milling** ; a **dry** cut; and very efficient suction or fluid shielding to capture dust-like graphite chips.

Cast **Iron**

Practical trials have shown that lamellar and globular cast **irons** can be machined at high speeds with type K10 and P40 coated carbides. When machining lamellar **irons** , the rate of metal removal can be increased by a factor of 10 when machined...

...a surface cutting speed (Vc) of 1000 m/min (3330 sfpm). At this speed, the **tool** life per **cutting** edge is approximately 20 m (67 feet). Surface quality is in the range of 0...

...of 0.3-0.4 mm (0.012-0.016 inches per tooth); down (climb) **milling** ; **dry** cut; a 12-degree clearance angle; and a 0-6 degree positive rake angle.

Tool life can be increased approximately 200 percent over carbide tools by using **silicon nitride** ceramic inserts. However, the assortment of inserts available under 25 mm (one inch), is limited. This situation

should improve as high-speed milling becomes more prevalent and as **silicon nitride** gains acceptance.

In general, the cutting data for steel can be applied to cast **iron** machining with coated carbides.

Steel

For conventional machining of steel with carbide tools, the usual...7 mm per tooth (0.020-0.028 inch), the highest tool life rates with **dry** climb (down) **milling** , were achieved. The surface finish ranged between 0.001 to 0.003 mm (0.00004 to 0.00012 inch). The use of a positive radial rake, conventional (up) milling and **cutting** fluids reduced **tool** life during these trials.

During tests with the free machining steels, the cutting speeds were ...

...cuts made dry and some with coolant. Tests were made with carbide, ceramic, and CBN **cutting** **tool** materials. In all cases, the tooth clearance angle was 20 degrees while the rake angle...

...best to start in these free machining steels with the same cutting parameters for cast **iron** . High-speed machining is only a problem when it encounters titanium and nickel alloys. Much...

```
Set     Items   Description
S1     390478   DRY OR NONLUBRIC? OR UNLUBRIC? OR (NON OR UN)()LUBRIC? OR -
             WITHOUT(3N)(CUTTING OR MACHIN? OR MILLING)()(FLUID? OR LIQUID?
              OR OIL OR OILS OR LUBRICA?)
S2     446256   MILLING OR BLUEPRINTING OR BLUE()PRINTING OR MACHINING OR -
             CUTTING
S3          4   DRYMILL? OR DRYMACHIN? OR DRYCUT?
S4      88013   (SILICO? OR SILICA? OR SILICI?)(2N)NITRID? OR SI3N4 OR SI(-
             )3()N()4 OR SI3()N4
S5      69677   (CUT OR CUTS OR CUTTER? OR CUTTING OR MILLING OR MACHINING-
             )(3N)(TOOL? OR INSERT? OR BIT OR BITS)
S6          0   IC=(B23C? OR B23B?)
S7    1117870   IRON?
S8        762   CASTIRON?
S9     568104   ALUMINIUM???
S10    555957   ALUMINUM???
S11   1176029   AL
S12    671819   FE
S13     47417   FERROUS
S14      2904   S1(3N)S2 OR S3
S15        53   S14 AND S4
S16        31   S15 AND S7:S13
S17        32   S15 AND S5
S18        53   S15:S17
S19        39   RD (unique items)
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         (c) 2004 ACFCI & Chambre CommInd Paris
File  96:FLUIDEX 1972-2004/Jan
         (c) 2004 Elsevier Science Ltd.
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File 25:Weldasearch 1966-2002/Jul
(c) 2004 TWI Ltd
File 118:ICONDA-Intl Construction 1976-2004/Jan
(c) 2004 Fraunhofer-IRB
File 144:Pascal 1973-2004/Jan W1
(c) 2004 INIST/CNRS

**19/3,K/2 (Item 2 from file: 94)**
DIALOG(R)File 94:JICST-EPlus


01530761 JICST ACCESSION NUMBER: 92A0506654 FILE SEGMENT: JICST-E
**Effect of Ferrite Phase Content in Gray Cast** Iron **on the Life of SiC Whisker Reinforced Ceramic** Cutting Tool .
SHINTANI KAZUHIRO (1); FUJIMURA YOSHIO (1); WATANABE YASUHIKO (2); UEKI MASANORI (3)
(1) Kanazawa Inst. of Technology; (2) Kanazawa Inst. of Technology, Graduate School; (3) Shinnittetsusentangijutsu
Imono(Journal of Japanese Foundry Engineering Society), 1992, VOL.64,NO.6, PAGE.397-402, FIG.11, TBL.2, REF.9
JOURNAL NUMBER: G0096AAT ISSN NO: 0021-4396 CODEN: IMNOA
UNIVERSAL DECIMAL CLASSIFICATION: 621.941/.95 666.5 669.017:620.181
LANGUAGE: Japanese COUNTRY OF PUBLICATION: Japan
DOCUMENT TYPE: Journal
ARTICLE TYPE: Original paper
MEDIA TYPE: Printed Publication

**Effect of Ferrite Phase Content in Gray Cast** Iron **on the Life of SiC Whisker Reinforced Ceramic** Cutting Tool .
ABSTRACT: In continuous **dry cutting** , performance of whisker reinforced ceramic tools was investigated using the gray cast **iron** with various ferrite phase content as the workpiece. On the machining of gray cast **iron** containing up to 10vol% ferrite phase, Al2O3+SiCW ceramic tool exhibited the tool life which is equivalent for the gray cast **iron** containing 0.5vol% ferrite phase. The life of **Si3N4** +SiCW ceramic **tool** for the **machining** of gray cast **iron** containing a small amount of ferrite phase was rather short. However, the tool life for the case of gray cast **iron** with large amount of ferrite phase was short for both **Si3N4** +SiCW and Al2O3+SiCW ceramic tools. Flank wear face of SiCW reinforced ceramic tools changed...

...phase content of the workpiece materials. In static heating test, it was observed diffusing of **Fe** into SiCW occurred. (author abst.)
...DESCRIPTORS: **silicon nitride** ; ...

...gray cast **iron** ;
...BROADER DESCRIPTORS: **aluminum** oxide...

... **aluminum** compound...

... **cutting tool** ( **machining** ); ...

...cast **iron** ; ...
... **iron** and steel

**19/3,K/9 (Item 5 from file: 95)**
DIALOG(R)File 95:TEME-Technology & Management


01393847 20000202228
**Ceramics and CBN. For high-speed, dry , and hard machining , these cutting tools may prove the ideal solution**
Schneider, J
CeramTec, Ebersbach/Fils, D
Manufacturing Engineering, v122, n1, pp66,68-73, 1999
Document type: journal article Language: English
Record type: Abstract
ISSN: 0361-0853

**Ceramics and CBN. For high-speed, dry , and hard machining , these cutting tools may prove the ideal solution**

ABSTRACT:
...in production time and cost can be achieved. The ability of these materials to run **dry** allows cleaner **machining** processes with reduced environmental and health impact, saving coolant, maintenance, and disposal costs. Many typical...

...today use the grades based on Al2O3 (including mixed ceramics and whisker-reinforced ceramics) and **Si3N4** ceramics. Coated ceramic grades also have become important, particularly for **Si3N4** ceramics. Polycrystalline cubic boron nitrides stand out for their high material hardness, hot hardness, and...

...hard machining. Hard machining places high demands on the machine tool, the chucking system, the **tool** and the **cutting** grade. Because hard machining involves high cutting loads, the cutting materials must provide high edge...

...economic benefits - cost per cutting edge is higher by a factor of 10 compared to **Si3N4** . Major opportunities will open up for all cutting materials that resist high temperatures, but particularly for ceramics and CBN used in **dry machining** .
DESCRIPTORS: **CUTTING** CERAMICS; **DRY** PROCESSING; **CUTTING TOOL** --

looked at

19/3,K/11 (Item 7 from file: 95)
DIALOG(R)File 95:TEME-Technology & Management


01346223 19990901606
**Chemical wear mechanisms of innovative ceramic** cutting tools **in the** machining **of steel**
Vleugels, J; Biest, Ovan der
Katholieke Univ. Leuven, B
Wear - An International Journal on the Science and Technology of Friction, Lubrication and Wear, v225/229, nPart 1, pp285-294, 1999
Document type: journal article Language: English
Record type: Abstract
ISSN: 0043-1648

**Chemical wear mechanisms of innovative ceramic** cutting tools **in the** machining **of** steel

ABSTRACT:
It is commonly known that commercially available uncoated hardmetals, cermets and **Si3N4** -based inserts are not suitable for high speed and **dry machining** of steel because of the chemical incompatibility of the above mentioned materials at elevated temperatures...
DESCRIPTORS: **CUTTING TOOL** ; CERAMIC MATRIX COMPOSITES; ZIRCONIUM OXIDES; MATERIAL COMPATIBILITY; CHEMICAL INTERACTION; THERMODYNAMIC PROPERTIES; COMPUTATIONAL PROCEDURE; HIGH TEMPERATURE BEHAVIOUR; TOOL WEAR; **DRY** PROCESSING; MECHANICAL **CUTTING** ; STEEL

**19/3,K/14 (Item 10 from file: 95)**
DIALOG(R)File 95:TEME-Technology & Management


01296663 M99040792533
**Beim Drehen die Nase vorne. Siliziumnitridkeramik fuer die wirtschaftliche Zerspanung von Guss-Werkstuecken**
Schneider, J
CeramTec, D
Fertigung, Landsberg, v26, n2 Sonderpublikation Werkzeuge, pp30,32, 1998
Document type: journal article Language: German
Record type: Abstract
ISSN: 0936-8760

...DESCRIPTORS: CUTTING SHAPING; **SILICON NITRIDE** ; CAST **IRON** ; ROUGHING MILLS...

... **MILLING** CUTTER; **CUTTING** SPEED; **INSERT** TIP; **DRY** PROCESSING

**19/3,K/15 (Item 11 from file: 95)**
DIALOG(R)File 95:TEME-Technology & Management


01284106 M99021490563
**Keramische Schneidstoffe**
(Ceramic cutting materials)
Fripan, M; Schneider, J
Hochleistungswerkzeuge: Schluessel fuer innovative Zerspantechnologien, High-Perfomance Tools: the Key to Innovative Cutting Technology, Tagung, Duesseldorf, D, 3.-4. Nov, 1998VDI-Berichte, v1399, n3/4, pp117-143, 1998
Document type: Conference paper Language: German
Record type: Abstract
ISBN: 3-18-091399-1
ISSN: 0083-5560

DESCRIPTORS: CUTTING CERAMICS; OXIDE CERAMICS; **SILICON NITRIDE** ; CUTTING SPEED; DUCTILE CAST **IRON** ; CAST **IRON** ; TURNING...

... **MACHINING** ; **DRY PROCESSING**

**19/3,K/16 (Item 12 from file: 95)**
DIALOG(R)File 95:TEME-Technology & Management


01255374 C98100105495
**Schneidkeramik fuer die Zerspannung von Gusseisenwerkstoffen und von gehaertetem Stahl - Hochgeschwindigkeits-, Trocken- und Hartbearbeitung**
(Cutting ceramics for the machining of cast **iron** and toughened steel. High-speed, **dry** , and hard **machining** )
Schneider, J
Ceram Tec, Ebersbach/Fils, D
Werkstoffgefuege und Zerspannung, DGM-Fortbildungsseminar, Hannover, D, 26.-27. Mai, 19981998
Document type: Conference paper Language: German
Record type: Abstract

(Cutting ceramics for the machining of cast **iron** and toughened steel. High-speed, **dry** , and hard **machining** )
DESCRIPTORS: CUTTING CERAMICS; BORON NITRIDE; CAST **IRON** ; SPEED; MILLING CUTTERS; DRILLING...

...MACHINING; **SILICON NITRIDE** ; TURNING...

...CUTTING SHAPING; MECHANICAL CUTTING; STEEL; HARD MATERIALS; SUMMARY; **ALUMINIUM** OXIDES; CARBIDES; NITRIDES; TITANIUM NITRIDE; TITANIUM CARBIDE; ZIRCONIUM OXIDES; POLYCRYSTALLINE MATERIALS

**19/3,K/17 (Item 13 from file: 95)**


01167512 M98010047536
**Improvement of machinability of sintered composite-type alloyed steel powder**
Yamaguchi, K; Nakamoto, T; Kitano, M; Suzuki, M; Abraha, PA
Nagoya Univ., J; Nippondenso, Kariya, J; Toyota Motor Corp., Toyota, J; Toyota Technol., Inst., Nagoya, J
Transactions of the ASME, Journal of Manufacturing Science and Engineering, v119, n4A, pp529-536, 1997
Document type: journal article Language: English
Record type: Abstract
ISSN: 1087-1357

ABSTRACT:
...recent years to the rapid increase of high strength materials. A typical powder consisting of **iron** with nickel and molybdenum as an additive which adheres to the surface of **iron** particles is used. This type of sintered alloyed steel causes excessive tool wear. The purpose...

...life 100 times. In the experiment the sintered alloyed steel was cut by longitudinal turning **without** a **cutting fluid** . **Cutting tools** were ceramic ( **Si3N4** ), cermet, K10, and P20; the tool life criterion was 0.2 mm flank wear. The...

...to clarify the mechanisms of the increase of tool life, the worn face of the **cutting tool** is examined by an EPMA (Electron Probe Microanalyzer). The analysis shows that the glass additive acts as a protective film and lubricant when cutting with **silicon nitride** and tungsten carbide tools, respectively.
...DESCRIPTORS: **CUTTING** SHAPING; SINTERED STEEL; **TOOL** WEAR; **SILICON NITRIDE** ; CARBIDE TOOLS; CERMETS; GLASS; ADDITIVES; PROTECTIVE LAYERS; LUBRICANT

19/3,K/19 (Item 15 from file: 95)
DIALOG(R)File 95:TEME-Technology & Management


01020334 C96080078492
**Tribological properties of AlN-CeO2-** Si3N4 cutting **materials in** unlubricated **sliding against tool steel and cast** iron
(Tribologische Eigenschaften von AlN-CeO2- **Si3N4** -Schneidstoffen bei ungeschmierter Gleitung auf Werkzeugstahl und Gusseisen)
Gomes, JR; Miranda, AS; Silva, RF; Vieira, JM
Univ. do Minho, Guimaraes, P; Univ. de Aveiro, P
Materials Science and Engineering, Part A (Structural Materials: Properties, Microstructure and Processing), vA209, n1-2, pp277-286, 1996
Document type: journal article Language: English
Record type: Abstract
ISSN: 0921-5093

**Tribological properties of AlN-CeO2-** Si3N4 cutting **materials in** unlubricated **sliding against tool steel and cast** iron
(Tribologische Eigenschaften von AlN-CeO2- **Si3N4** -Schneidstoffen bei ungeschmierter Gleitung auf Werkzeugstahl und Gusseisen)

ABSTRACT:
Ceramic pins of the AlN-CeO2- **Si3N4** system were tested in a pin-on-disc tribometer against discs of tool steel and grey cast **iron** , at room temperature, without lubrication, in different conditions of humidity and sliding speed. Ceramic samples...

...and the wear coefficients of the ceramic converged to similar values for tests with both **iron** alloys. For the ceramic/tool steel tribopairs, the ceramic surfaces become more protected as the...

...hardness and fracture toughness. In humide environments, the effect of roughness of the grey cast **iron** worn surface surmounted the dependence of the wear rate on microstructural and mechanical properties of...

...coefficients of porous nitride materials of relative open porosity close to 20 %, tested against cast **iron** , were unexpectedly lower than the values obtained for dense materials of same composition(K is...
DESCRIPTORS: CUTTING CERAMICS; **ALUMINIUM** NITRIDE; CERIUM OXIDES; ALPHA **SILICIUM NITRIDE** ; TRIBOLOGY; MICROSTRUCTURE; POROSITY; GRAIN BOUNDARIES; MOIST ATMOSPHERE; WEAR; SCANNING ELECTRON MICROSCOPES; X RAY DISPERSIVE ANALYSIS...
IDENTIFIERS: INTERGRANULARE PHASE; AlN; CeO2; **Si3N4** ; Gleitverschleiss

**19/3,K/20 (Item 16 from file: 95)**
DIALOG(R)File 95:TEME-Technology & Management


00917038 M95070171683
**Trockenbearbeitung von Grauguss mit hohen Schnittgeschwindigkeiten**
( **Dry machining** of gray cast **iron** at high cutting rates)
Spur, G; Lachmund, W
TU Berlin, D
ZWF Zeitschrift fuer wirtschaftlichen Fabrikbetrieb, v90, n6, pp302-305, 1995
Document type: journal article Language: German
Record type: Abstract
ISSN: 0947-0085

( **Dry machining** of gray cast **iron** at high cutting rates)
...DESCRIPTORS: **IRON** ; EXPERIMENTAL RESULTS; TURNING...

...CUTTING SHAPING; CUTTING FLUID; **ALUMINIUM** OXIDES; **SILICON NITRIDE** ; CUTTING EDGE; SURFACE QUALITY; ROUGHNESS DEPTH; CUTTING SPEED; ROUGHNESS; DEPTH; EXPERIMENTAL STUDY; LUBRICANT; CHILLING; INSERT

**19/3,K/21 (Item 1 from file: 35)**
DIALOG(R)File 35:Dissertation Abs Online


01117590 ORDER NO: AAD90-23461
**AN EXPERIMENTAL STUDY OF THE EFFECT OF MACHINING VARIABLES ON THE SURFACE INTEGRITY OF INCONEL 718 SUPERALLOY**
Author: REDDY, Y. KRISHNA MOHAN
Degree: PH.D.
Year: 1989
Corporate Source/Institution: THE UNIVERSITY OF TEXAS AT ARLINGTON (2502)
Source: VOLUME 51/03-B OF DISSERTATION ABSTRACTS INTERNATIONAL. PAGE 1461. 195 PAGES

...chip contact lengths (0.051, 0.102 mm, natural) under both lubricated and unlubricated conditions. **Silicon - nitride** based ceramic **insert cutting tools** with positive five degree primary rake angle were used. The support for this work was...

...angle and temperature were calculated.
Tool forces decreased and shear angles increased both with increased **cutting** speeds and reduced **tool** -chip contact lengths. Shear stress on shear plane was independent of test conditions investigated. Continuous... ...and the depth of deformed zone decreased with increased cutting speeds and reduced depth of **cut** and reduced **tool** -chip contact length. Residual tensile stress was produced in all the cases, which increased with...

...long grooves were noticed at lower cutting speeds and severely fractured surfaces were observed with **dry cutting** . Overall surface integrity was better with lubricant, low depths of **cut** , controlled contact length **tools** and at high **cutting** speeds. The extensive experimental data also helped the validation of a parallel predective study involving...

note to self
Inconel 718
contains
both Al & Fe

**19/3,K/26 (Item 1 from file: 8)**
DIALOG(R)File 8:Ei Compendex(R)


04831410 E.I. No: EIP97093843806
**Title:** Dry machining **- a promising option**
Author: Heine, Hans J.
Source: American Machinist v 141 n 8 Aug 1997. p 92, 94
Publication Year: 1997
CODEN: AMMAAA ISSN: 1041-7958
Language: English

**Title:** Dry machining **- a promising option**
Abstract: The success of **dry machining** depends on finding alternative means for the functions of coolants and lubricants. Without a doubt...

...and workpiece. The innovations made in Germany which has led to more frequent use of **dry machining** methods are discussed.
Descriptors: **Machining** ; Coolants; Lubricants; Machine **tools** ; Machine shops; Friction; **Silicon nitride** ; Ceramic **cutting tools** ; Lubrication
Identifiers: **Dry machining** ; Titanium **aluminum** nitride; Minimum lubrication

19/3,K/28 (Item 3 from file: 8)
DIALOG(R)File 8:Ei Compendex(R)


04046628 E.I. No: EIP95012529421
**Title: Cutting forces of ceramic** cutting tools
Author: Li, Xing Sheng; Low, It-Meng
Corporate Source: Curtin Univ of Technology, Perth, Aust
Source: Key Engineering Materials 96 1994. p 81-136
Publication Year: 1994
CODEN: KEMAEY ISSN: 0252-1059
Language: English

**Title: Cutting forces of ceramic** cutting tools
Abstract: This chapter examines the influence of cutting parameters (cutting speed, feed rate and depth of cut ), ceramic **tool** materials, work materials and tool geometry on static and dynamic **cutting** forces. The **cutting inserts** tested included alumina-based and **silicon nitride** -based ceramic tools, and ceramic-coated carbide tools. An uncoated carbide was studied for comparison...

...1-0.4 mm/rev) and depths of cut (0.5-2.0 mm), in **dry** conditions. Three **cutting** force components, namely principal force F//z, feed force F//x and thrust force F...
...cutting process was evaluated. Cutting forces of these ceramic tools were compared. The correlations between **cutting** force components and **tool** wear were analysed. (Author abstract) 20 Refs.
Descriptors: Ceramic **cutting tools** ; Alumina; Titanium carbide; Silicon carbide; Crystal whiskers; **Silicon nitride** ; Coatings; Geometry; Machining; Materials testing

**19/3,K/33 (Item 1 from file: 34)**
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci


10229952 Genuine Article#: BT32X No. References: 15
**Title: Perspectives on the development of ceramic composites for** cutting tool **applications**
Author(s): Van der Biest O (REPRINT) ; Vleugels J
Corporate Source: Katholieke Univ Leuven,Dept Met & Mat Engn,Kasteelpk Arenberg,44/B-3001 Heverlee//Belgium/ (REPRINT); Katholieke Univ Leuven,Dept Met & Mat Engn,B-3001 Heverlee//Belgium/
, 2002, V206-2, P955-960
ISSN: 1013-9826 Publication date: 20020000
Publisher: TRANS TECH PUBLICATIONS LTD, BRANDRAIN 6, CH-8707 ZURICH-UETIKON, SWITZERLANDEURO CERAMICS VII, PT 1-3
Series: KEY ENGINEERING MATERIALS
Language: English Document Type: ARTICLE (ABSTRACT AVAILABLE)

**Title: Perspectives on the development of ceramic composites for** cutting tool **applications**
Abstract: The requirements for ceramic composites as **cutting tools** for **machining iron** based alloys are reviewed, taking into account the trends in the industry towards **dry** high speed **cutting** and the need for tools with complex geometry. Chemical compatibility with **iron** is a major criterion to guide the selection of ceramic phases. The thermodynamically calculated total solubility of **cutting tool** in workpiece material correlates very well with the in service wear behaviour at high speed...
...Identifiers--CHEMICAL-REACTIVITY; **SILICON - NITRIDE** ; STEEL; WEAR; ALLOYS

**19/3,K/39 (Item 5 from file: 144)**
DIALOG(R)File 144:Pascal


12654498 PASCAL No.: 96-0349530
**Tribological properties of AlN-CeO SUB 2 -Si SUB 3 N SUB 4** cutting **materials in** unlubricated **sliding against tool steel and cast** iron
GOMES J R; MIRANDA A S; SILVA R F; VIEIRA J M
SARIN Vinot K, ed
Departamento de Engenharia Mecanica, Universidade do Minho, 4800 Guimaraes, Portugal
Manufacturing Engineering, Boston University, Boston, MA 02215, United States
ICSHM 5: International Conference on the Science of Hard Materials, 5 ( Maui, Hawaii USA) 1995-02-20
Journal: Materials science & engineering. A, Structural materials : properties, microstructure and processing, 1996, 209 (1-2) 277-286
Language: English

**Tribological properties of AlN-CeO SUB 2 -Si SUB 3 N SUB 4** cutting **materials in** unlubricated **sliding against tool steel and cast** iron
... tested in a pin-on-disc tribometer against discs of tool steel and grey cast **iron** , at room temperature, without lubrication, in different conditions of humidity and sliding speed. Ceramic samples...
...and the wear coefficients of the ceramic converged to similar values for tests with both **iron** alloys. For the ceramic/tool steel tribopairs, the ceramic surfaces become more protected as the...

... hardness and fracture toughness. In humid environments, the effect of roughness of the grey cast **iron** worn surface surmounted the dependence of the wear rate on microstructural and mechanical properties of...

...coefficients of porous nitride materials of relative open porosity close to 20%. tested against cast **iron** , were unexpectedly lower than the values obtained for dense materials of same composition (K 2...

English Descriptors: Ceramic materials; **Cutting tool** materials; Tribology; Sliding friction; Wear; Friction; Tool steel; Grey **iron** ; Experimental study; **Silicon nitride** ; **Silicon** oxides; **Aluminium nitride** ; Cerium oxide; Chemical composition

...French Descriptors: Tribologie; Frottement glissement; Usure; Frottement ; Acier outil; Fonte grise; Etude experimentale; Silicium nitrure; Silicium oxyde; **Aluminium** nitrure; Cerium oxyde; Composition chimique

```
Set     Items   Description
S1     218362   DRY OR NONLUBRIC? OR UNLUBRIC? OR (NON OR UN)()LUBRIC? OR -
            WITHOUT(3N)(CUTTING OR MACHIN? OR MILLING)()(FLUID? OR LIQUID?
             OR OIL OR OILS OR LUBRICA?)
S2     176012   MILLING OR BLUEPRINTING OR BLUE()PRINTING OR MACHINING OR -
            CUTTING
S3         18   DRYMILL? OR DRYMACHIN? OR DRYCUT?
S4      26187   (SILICO? OR SILICA? OR SILICI?)(2N)NITRID? OR SI3N4 OR SI(-
            )3()N()4 OR SI3()N4
S5      24552   (CUT OR CUTS OR CUTTER? OR CUTTING OR MILLING OR MACHINING-
            )(3N)(TOOL? OR INSERT? OR BIT OR BITS)
S6       7701   IC=(B23C? OR B23B?)
S7     113293   IRON?
S8         19   CASTIRON?
S9     134808   ALUMINIUM???
S10    172301   ALUMINUM???
S11   1947319   AL
S12     70694   FE
S13     16180   FERROUS
S14      1619   S1(3N)S2 OR S3
S15       176   S14 AND S4
S16       173   S15 AND S7:S13
S17       176   S15:S16
S18        30   S17 AND S14(5N)S7:S13
S19        17   S17 AND S4(5N)S5
S20        45   S18:S19
S21         4   S20 AND S6
S22        45   S20:S21
S23        45   IDPAT (sorted in duplicate/non-duplicate order)
? show files
File 348:EUROPEAN PATENTS 1978-2004/Jan W02
         (c) 2004 European Patent Office
File 349:PCT FULLTEXT 1979-2002/UB=20031225,UT=20031218
         (c) 2003 WIPO/Univentio
```

**23/5/15 (Item 15 from file: 348)**
DIALOG(R)File 348:EUROPEAN PATENTS


00530942
Silicon nitride **sintered product excellent in wear resistance**
Siliciumnitrid **-Sinterprodukt mit ausgezeichneter Abriebsbestandigkeit**
**Produit fritte en nitrure de silicium ayant une excellente resistance a l'usure par abrasion**

PATENT ASSIGNEE:
NGK SPARK PLUG CO., LTD, (560166), 14-18, Takatsuji-cho, Mizuho-ku Nagoya-shi Aichi, (JP), (applicant designated states: DE;FR;GB;IT)
INVENTOR:
Mizuno, Ken-ichi, c/o NGK Spark Plug Co., Ltd., No.14-18, Takatsuji-cho, Mizuho-ku, Nagoya-shi, Aichi, (JP)
Tajima, Yo, c/o NGK Spark Plug Co., Ltd., No.14-18, Takatsuji-cho, Mizuho-ku, Nagoya-shi, Aichi, (JP)
LEGAL REPRESENTATIVE:
Grunecker, Kinkeldey, Stockmair & Schwanhausser Anwaltssozietat (100721), Maximilianstrasse 58, 80538 Munchen, (DE)

PATENT (CC, No, Kind, Date): EP 545382 A2 930609 (Basic)
EP 545382 A3 931222
EP 545382 B1 960731
APPLICATION (CC, No, Date): EP 92120561 921202;
PRIORITY (CC, No, Date): JP 91349227 911205
DESIGNATED STATES: DE; FR; GB; IT
INTERNATIONAL PATENT CLASS: C04B-035/593;
CITED PATENTS (EP A): EP 356244 A
CITED REFERENCES (EP A):
AMERICAN CERAMIC SOCIETY BULLETIN vol. 65, no. 9, September 1986, COLUMBUS, OHIO, US pages 1311 - 1315 E. TANI ET AL. 'Gas-pressure sintering of Si3N4 with concurrent addition of Al2O3 and 5 wt.% rare earth oxide'
CHEMICAL ABSTRACTS, vol. 110, no. 8, 17 April 1989, Columbus, Ohio, US; abstract no. 140367q, S. KOSAKA ET AL. 'High-density silicon nitride sintered ceramics with high strength particularly at high temperatures' page 325 ;;

ABSTRACT EP 545382 A2
A **silicon nitride** sintered product for use in **cutting tools** and the like which has **silicon nitride** as a predominant phase, and comprises 0.1 to 1% by weight of **Al** as calculated on the basis of **Al** (sub 2)O(sub 3), the **total** amount of sintering aid constituents other than **Al** being 6% by weight or less on the oxide basis, the content of the grain boundary glassy phase being 8% by volume or less. The **silicon nitride** sintered product preferably has a relative density of 99% or more.
ABSTRACT WORD COUNT: 89

LEGAL STATUS (Type, Pub Date, Kind, Text):
Application: 930609 A2 Published application (A1with Search Report ;A2without Search Report)
Search Report: 931222 A3 Separate publication of the European or **International** search report
Examination: 940302 A2 Date of filing of request for examination: 931228
Examination: 940323 A2 Date of despatch of first examination report: 940204
Grant: 960731 B1 Granted patent
Oppn None: 970723 B1 No opposition filed

LANGUAGE (Publication,Procedural,Application): English; English; English
FULLTEXT AVAILABILITY:

| Available Text | Language | Update | Word Count |
|---|---|---|---|
| CLAIMS B | (English) | EPAB96 | 113 |
| CLAIMS B | (German) | EPAB96 | 86 |
| CLAIMS B | (French) | EPAB96 | 124 |
| SPEC B | (English) | EPAB96 | 2110 |
| Total word count - document A | | | 0 |
| Total word count - document B | | | 2433 |
| Total word count - documents A + B | | | 2433 |

23/5/16 (Item 16 from file: 348)
DIALOG(R)File 348:EUROPEAN PATENTS


equiv US 5296008
Grades of gray cast iron WFPC, speed for slot

00513094
**Tool of silicon nitride sintered body**
**Werkzeug aus gesintertem** Siliciumnitrid
**Outil en nitrure de silicium fritte**
PATENT ASSIGNEE:
SUMITOMO ELECTRIC INDUSTRIES, LIMITED, (279014), 5-33, Kitahama 4-chome Chuo-ku, Osaka 541, (JP), (applicant designated states: DE;ES;FR;GB;IT;SE)
INVENTOR:
Moriguchi, Hideki, c/o Itami Works, Sumimoto Electric Ind. Ltd. 1-1, Koyakita 1-chome, Itami-shi, Hyogo, (JP)
Kobayashi, Mitsunori, c/o Itami Works, Sumimoto Electric Ind. Ltd. 1-1, Koyakita 1-chome, Itami-shi, Hyogo, (JP)
Nomura, Toshio, c/o Itami Works, Sumimoto Electric Ind. Ltd. 1-1, Koyakita 1-chome, Itami-shi, Hyogo, (JP)
Nakamata, Tosiaki, Sumimoto Electric Igetally Corporation Limited, 10-9, Shinmachi 1-chome, Nishi-ku, Osaka, (JP)
LEGAL REPRESENTATIVE:
Kirschner, Klaus Dieter, Dipl.-Phys. (6504), Patentanwalte Herrmann-Trentepohl, Kirschner, Grosse, Bockhorni & Partner Forstenrieder Allee 59, D-81476 Munchen, (DE)
PATENT (CC, No, Kind, Date): EP 499861 A1 920826 (Basic)
EP 499861 B1 960117
APPLICATION (CC, No, Date): EP 92101647 920131;
PRIORITY (CC, No, Date): JP 9122370 910215; JP 9134695 910228
DESIGNATED STATES: DE; ES; FR; GB; IT; SE
INTERNATIONAL PATENT CLASS: C04B-041/91; C04B-041/89; **B23B-027/14**
CITED PATENTS (EP A): DE 3423911 A; DE 3423911 A; EP 298729 A
CITED REFERENCES (EP A):
WORLD PATENT INDEX LATEST, Derwent Publications Ltd., LONDON, GB. Week 8042. &JP-A-55113672(Tokyo Shibaura El. Ltd)03-09-1980
CERAMICS INTERNATIONAL. vol. 16, no. 5, 1990, BARKING, ESSEX GB pages 253 - 257; W.J. TOMLINSON ET AL: 'Effect of grindin, lapping and various surface treatments on the strength of silicon nitride'
WORLD PATENT INDEX LATEST, Derwent Publications Ltd., LONDON, GB. Week 8201. &JP-A-56155080(Sumitomo Elec.Ind.K.K.)01-12-1981;

ABSTRACT EP 499861 A1
A tool of a silicon nitride sintered body is formed by a silicon nitride sintered body which contains silicon nitride as well as a sintering aid and is sintered under a normal pressure, and freely grown b-Si(sub 3)N(sub 4) (including b'-SIALON) is removed from its sintering surface. A tool of a surface-coated silicon nitride sintered body is formed by coating the surface of a base material, which is formed in a similar manner to the above, with a layer of carbide of Ti or the like having a thickness of 0.1 to 10 (mu)m and/or a layer of A(liters)(sub 2)O(sub 3) having a thickness of 0.4 to 10 (mu)m. According to such structures, provided are tools of a silicon nitride sintered body and a surface-coated silicon nitride sintered body, each of which is excellent in wear resistance as well as toughness and can be manufactured at a low cost. (see image in original document)
ABSTRACT WORD COUNT: 156

LEGAL STATUS (Type, Pub Date, Kind, Text):
Application: 920826 A1 Published application (A1with Search Report ;A2without Search Report)
Examination: 921125 A1 Date of filing of request for examination:

| | | | |
|---|---|---|---|
| | | 920924 | |
| Examination: | 940608 | A1 | Date of despatch of first examination report: 940427 |
| Grant: | 960117 | B1 | Granted patent |
| Oppn None: | 970108 | B1 | No opposition filed |

LANGUAGE (Publication,Procedural,Application): English; English; English

FULLTEXT AVAILABILITY:

| Available Text | Language | Update | Word Count |
|---|---|---|---|
| CLAIMS A | (English) | EPABF1 | 535 |
| CLAIMS B | (English) | EPAB96 | 337 |
| CLAIMS B | (German) | EPAB96 | 297 |
| CLAIMS B | (French) | EPAB96 | 383 |
| SPEC A | (English) | EPABF1 | 4226 |
| SPEC B | (English) | EPAB96 | 4262 |
| Total word count - document A | | | 4761 |
| Total word count - document B | | | 5279 |
| Total word count - documents A + B | | | 10040 |

**23/5/22 (Item 22 from file: 348)**
DIALOG(R)File 348:EUROPEAN PATENTS


00356306
**Hard sintered body for tools.**
**Harter Sinterkorper fur Werkzeuge.**
**Corps dur fritte pour des outils.**
PATENT ASSIGNEE:
SUMITOMO ELECTRIC INDUSTRIES, LTD., (279013), 5-33, Kitahama 4-chome, Chuo-ku, Osaka-shi, Osaka 541, (JP), (applicant designated states: DE;ES;FR;GB;SE)
INVENTOR:
Fukaya, Tomohiro c/o Itami Works Sumitomo, Electric Industries, Ltd. 1-1 Koyakita 1-chome, Itami-shi Hyogo-ken, (JP)
Nakai, Tetsuo c/o Itami Works Sumitomo, Electric Industries, Ltd. 1-1 Koyakita 1-chome, Itami-shi Hyogo-ken, (JP)
Goto, Mitsuhiro c/o Itami Works Sumitomo, Electric Industries, Ltd. 1-1 Koyakita 1-chome, Itami-shi Hyogo-ken, (JP)
LEGAL REPRESENTATIVE:
Herrmann-Trentepohl, Werner, Dipl.-Ing. et al (5373), Patentanwalte Herrmann-Trentepohl, Kirschner, Grosse, Bockhorni & Partner Forstenrieder Allee 59, D-81476 Munchen, (DE)
PATENT (CC, No, Kind, Date): EP 386338 A1 900912 (Basic)
EP 386338 B1 940601
APPLICATION (CC, No, Date): EP 89123215 891215;
PRIORITY (CC, No, Date): JP 8952962 890307; JP 8952963 890307
DESIGNATED STATES: DE; ES; FR; GB; SE
INTERNATIONAL PATENT CLASS: C22C-029/02; C22C-029/16; C22C-026/00; C04B-035/58;
CITED PATENTS (EP A): FR 2375155 A; EP 228693 A
CITED REFERENCES (EP A):
PATENT ABSTRACTS OF JAPAN, vol. 6, no. 257 (C-140), 16th December 1982; & JP-A-57 149 448 (MITSUBISHI)
PATENT ABSTRACTS OF JAPAN, vol. 7, no. 219 (C-188), 29th September 1983; & JP-A-58 113 349 (MITSUBISHI)
PATENT ABSTRACTS OF JAPAN, vol. 13, no. 55 (M-795), 8th February 1989; & JP-A-63 260 701 (SUMITOMO)
PATENT ABSTRACTS OF JAPAN, vol. 12, no. 398 (C-538), 21st October 1988; & JP-A-63 143 237 (SUMITOMO);

ABSTRACT EP 386338 A1
A hard sintered body for tools is obtained by sintering mixed powder containing at least 20 percent by volume and not more than 70 percent by volume of cubic boron nitride powder and having a remainder formed of binder powder under a superhigh pressure. The binder contains at least 2 percent by weight and not more than 20 percent by weight of **Al** and at least 2 percent by weight and not more than 20 percent by weight of W, and has a remainder formed of Ti compound(s). The atomic ratio of Ti contained in the binder to transition metal element(s) belonging to the group IVa, Va and/or VIa of the periodic table including Ti is at least 2/3 and not more than 97/100. In the structure of the sintered body, cubic boron nitride crystals are bonded with each other through bonding phases formed by the binder. When at least one or more Ti compounds are selected from a group of TiN( sub(z)), Ti(C,N)( sub(z)), TiC( sub(z)), (Ti,M)N( sub(z)), (Ti,M)(C,N)( sub(z)) and (Ti,M)C( sub(z)), where M represents transition metal element(s) belonging to the group IVa, Va and/or VIa of the periodic table excluding Ti and 0.1 <= z <= 0.45, a sintered body which is excellent in crater wear resistance and applicable to high-speed cutting of steel or cast **iron** is obtained.
ABSTRACT WORD COUNT: 226

LEGAL STATUS (Type, Pub Date, Kind, Text):

| | | | |
|---|---|---|---|
| Application: | 900912 | A1 | Published application (A1with Search Report ;A2without Search Report) |
| Examination: | 900912 | A1 | Date of filing of request for examination: 900704 |
| *Assignee: | 910313 | A1 | Applicant (transfer of rights) (change): SUMITOMO ELECTRIC INDUSTRIES, LTD. (279013) 5-33, Kitahama 4-chome, Chuo-ku Osaka-shi, Osaka 541 (JP) (applicant designated states: DE;ES;FR;GB;SE) |
| Examination: | 930414 | A1 | Date of despatch of first examination report: 930303 |
| Grant: | 940601 | B1 | Granted patent |
| Oppn None: | 950524 | B1 | No opposition filed |

LANGUAGE (Publication,Procedural,Application): English; English; English

FULLTEXT AVAILABILITY:

| Available Text | Language | Update | Word Count |
|---|---|---|---|
| CLAIMS B | (English) | EPBBF1 | 584 |
| CLAIMS B | (German) | EPBBF1 | 493 |
| CLAIMS B | (French) | EPBBF1 | 652 |
| SPEC B | (English) | EPBBF1 | 3600 |
| Total word count - document A | | | 0 |
| Total word count - document B | | | 5329 |
| Total word count - documents A + B | | | 5329 |

US 4892792

23/5/24 (Item 24 from file: 348)
DIALOG(R)File 348:EUROPEAN PATENTS


00299412
**AlN coated** silicon nitride **-based** cutting tools .
**Schneidgerat aus mit** Aluminiumnitrid **beschichtetem** Siliciumnitrid .
**Outil de coupe a base de nitrure de silicium revetu de nitrure d'** aluminium

PATENT ASSIGNEE:
VALENITE INC., (1151372), 1209 Orange Street, Wilmington Delaware 19801, (US), (applicant designated states: CH;DE;FR;GB;IT;LI;SE)
INVENTOR:
Sarin, Vinod K., 7 Diamond Road, Lexington, MA 02173, (US)
D'Angelo, Charles, 12 Maple Crest Drive, Sotuborough, MA 01722, (US)
LEGAL REPRESENTATIVE:
Patentanwalte Grunecker, Kinkeldey, Stockmair & Partner (100721), Maximilianstrasse 58, D-80538 Munchen, (DE)
PATENT (CC, No, Kind, Date): EP 310042 A2 890405 (Basic)
EP 310042 A3 890927
EP 310042 B1 940406
APPLICATION (CC, No, Date): EP 88116023 880928;
PRIORITY (CC, No, Date): US 103333 871001
DESIGNATED STATES: CH; DE; FR; GB; IT; LI; SE
INTERNATIONAL PATENT CLASS: C04B-041/87; C04B-041/89; **B23B-027/14**
CITED PATENTS (EP A): WO 8501474 A
CITED REFERENCES (EP A):
CHEMICAL ABSTRACTS, vol. 98, no. 8, 24th February 1983, page 287, abstract no. 58865a, Columbus, Ohio, US; & JP-A-57 145 088 (HITACHI METALS LTD) 07-09-1982
CHEMICAL ABSTRACTS>, vol. 105, no. 2, July 1986, page 279, abstract no. 10818y, Columbus, Ohio, US; & JP-A-61 26 581 (SUMITOMO ELECTRIC INDUSTRIES LTD) 05-02-1986;

ABSTRACT EP 310042 A2
Cutting tools, cutting tool inserts, and wear parts having improved **mechanical** and **chemical** wear resistance under demanding conditions of machining speed, temperature, or wear conditions comprising a monolithic or composite **silicon nitride** -based substrate having a hard adherent coating layer of a refractory **aluminum** nitride, and optionally an outer adherent coating layer of a refractory **material** . The preferred outer layer refractory materials are the carbides, nitrides, and carbonitrides of Ti, Zr, Hf, Nb, V, Ta, Cr, Mo, and W, and mixtures and solid solutions thereof, alumina and zirconia.
ABSTRACT WORD COUNT: 91

LEGAL STATUS (Type, Pub Date, Kind, Text):
Application: 890405 A2 Published application (A1with Search Report ;A2without Search Report)
Search Report: 890927 A3 Separate publication of the European or **International** search report
Examination: 900411 A2 Date of filing of request for examination: 900213
Examination: 910807 A2 Date of despatch of first examination report: 910626
Change: 930303 A2 Representative (change)
*Assignee: 930303 A2 Applicant (transfer of rights) (change): GTE VALENITE CORPORATION (1151371) 1209 Orange Street Wilmington Delaware 19801 (US) (applicant designated states:

| | | | |
|---|---|---|---|
| | | | CH;DE;FR;GB;IT;LI;SE) |
| Grant: | 940406 | B1 | Granted patent |
| *Assignee: | 940713 | B1 | Proprietor of the patent (transfer of rights): Valenite Inc. (1678201) 32 Lockerman Square, Ste. L-100 Dover, Delaware 19901 (US) (applicant designated states: CH;DE;FR;GB;IT;LI;SE) |
| Oppn None: | 950329 | B1 | No opposition filed |
| Lapse: | 950809 | B1 | Date of lapse of the European patent in a Contracting State: CH 940930, LI 940930 |
| Lapse: | 950809 | B1 | Date of lapse of the European patent in a Contracting State: CH 940930, LI 940930 |
| Lapse: | 951102 | B1 | Date of lapse of the European patent in a Contracting State: CH 940930, LI 940930, DE 950601, GB 940928 |
| Lapse: | 960117 | B1 | Date of lapse of the European patent in a Contracting State: CH 940930, LI 940930, DE 950601, FR 950531, GB 940928, SE 940929 |

LANGUAGE (Publication,Procedural,Application): English; English; English
FULLTEXT AVAILABILITY:

| Available Text | Language | Update | Word Count |
|---|---|---|---|
| CLAIMS B | (English) | EPBBF1 | 704 |
| CLAIMS B | (German) | EPBBF1 | 627 |
| CLAIMS B | (French) | EPBBF1 | 858 |
| SPEC B | (English) | EPBBF1 | 1576 |
| Total word count - document A | | | 0 |
| Total word count - document B | | | 3765 |
| Total word count - documents A + B | | | 3765 |

**23/5/37 (Item 37 from file: 349)**
DIALOG(R)File 349:PCT FULLTEXT


00909512
**METHOD OF MILLING ENGINE BLOCKS**
**PROCEDE DE FRAISAGE DE BLOCS-CYLINDRES**

present case

Patent Applicant/Assignee:
SANDVIK AB; (publ), SE-811 81 Sandviken, SE, SE (Residence), SE (Nationality)
Inventor(s):
DAHL Katarina, Barrsatra Furuvag 51, S-811 36 Sandviken, SE,
HESSMAN Ingemar, Silverslingan 19, S-811 52 Sandviken, SE,
Legal Representative:
TAQUIST Lennart (agent), Sandvik AB, Patent Dept, S-811 81 Sandviken, SE,

Patent and Priority Information (Country, Number, Date):
Patent: WO 200242027 A1 20020530 (WO 0242027)
Application: WO 2001SE2532 20011114 (PCT/WO SE0102532)
Priority Application: SE 20004274 20001122
Designated States: IL JP KR
(EP) AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE TR
Main International Patent Class: **B23C-003/00**
Publication Language: English
Filing Language: English
Fulltext Availability:
Detailed Description
Claims
Fulltext Word Count: 766

English Abstract
The present invention relates to a method of milling a material comprising **aluminium** and cast **iron** . By using a **silicon nitride** based **cutting tool insert** at a **cutting** speed of more than 1000 m/min an unexpected increase in tool life has been obtained.

French Abstract
La presente invention concerne un procede de fraisage d'un materiau contenant de l' **aluminium** et de la fonte. L'utilisation d'une plaquette de coupe a base de nitrure de silicone a une vitesse de coupe d'au moins 1000 m/min permet d'augmenter la duree de vie de facon inattendue.

Legal Status (Type, Date, Text)
Publication 20020530 A1 With international search report.
Examination 20021219 Request for preliminary examination prior to end of 19th month from priority date

23/5/40 (Item 40 from file: 349)
DIALOG(R)File 349:PCT FULLTEXT
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US 6395207

00823126

**PROCESS FOR PRODUCING GRAY CAST IRON FOR USE IN HIGH SPEED MACHINING WITH CUBIC BORON NITRIDE AND SILICON NITRIDE TOOLS AND THE GRAY CAST IRON SO PRODUCED**

**PROCEDE DESTINE A PRODUIRE DE LA FONTE GRISE S'UTILISANT DANS L'USINAGE A GRANDE VITESSE AVEC DES OUTILS EN NITRURE DE BORE CUBIQUE ET EN NITRURE DE SILICIUM, ET FONTE GRISE AINSI PRODUITE**

Patent Applicant/Inventor:
SUBRAMANIAN Sundaresa V, 84 Bowman Street, Hamilton, Ontario L8S 2T6, CA, CA (Residence), CA (Nationality)

Patent and Priority Information (Country, Number, Date):
Patent: WO 200155458 A1 20010802 (WO 0155458)
Application: WO 2001IB23 20010111 (PCT/WO IB0100023)
Priority Application: US 2000494100 20000128
Designated States: CA JP MX
(EP) AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE TR
Main International Patent Class: C21C-001/08
Publication Language: English
Filing Language: English
Fulltext Availability:
Detailed Description
Claims
Fulltext Word Count: 7254

gray cast iron, SW but is a turning oil, not milling

English Abstract
Processes for producing gray cast **iron** and the resulting gray cast **iron** exhibiting consistently good surface finish with prolonged **tool** life during finish **machining** with cubic boron **nitride** and **silicon nitride cutting tools** at high **cutting** speeds and low feed rates are provided comprising (1) adding microalloying elements with strong affinity for nitrogen to a gray **iron** melt; (2) adding microalloying elements with strong affinity for carbon to said melt; and (3) adding microalloying elements with strong affinity for oxygen to said melt, to form a chemically stable, high melting or refractory oxide protective layer at the cutting edge of the tool during metal cutting, thereby suppressing chemical wear.

French Abstract
L'invention concerne des procedes destines a produire de la fonte grise, la fonte grise qui en resulte presentant une bonne finition de surface uniforme avec un outil pourvu d'une duree de vie accrue durant l'usinage de finition avec des outils de coupe en nitrure de bore cubique et en nitrure de silicium a des vitesses de coupe elevees et a des taux d'alimentation faibles. Ces procedes consistent : (1) a ajouter des elements de microalliage presentant une forte affinite pour l'azote a la fusion de fonte grise, (2) a ajouter des elements de microalliage presentant une forte affinite pour le carbone a cette fusion, et (3) a ajouter des elements de microalliage presentant une forte affinite pour l'oxygene a cette fusion, afin de former une couche protectrice d'oxyde refractaire ou a fusion elevee, stable sur le plan chimique, au niveau de l'arete de coupe de l'outil lors du decoupage du metal, supprimant ainsi l'usure chimique.

Legal Status (Type, Date, Text)
Publication 20010802 A1 With international search report.
Examination 20011206 Request for preliminary examination prior to end of

19th month from priority date

23/5/43 (Item 43 from file: 349)
DIALOG(R)File 349:PCT FULLTEXT


00126361

**METHOD OF MACHINE CUTTING SILICON METAL PARTICULATES WITH** Si3N4
**PROCEDE DE DECOUPAGE A LA MACHINE DE MACROPARTICULES DE SILICIUM METAL AVEC DU Si3M4**

Patent Applicant/Assignee:
FORD-WERKE AKTIENGESELLSCHAFT,
FORD FRANCE S A,
FORD MOTOR COMPANY LIMITED,
FORD MOTOR COMPANY,
ALLOR Richard L,
Inventor(s):
ALLOR Richard L,

Patent and Priority Information (Country, Number, Date):
Patent: WO 8504617 A1 19851024
Application: WO 84US583 19840413 (PCT/WO US8400583)
Priority Application: WO 84US583 19840413
Designated States: DE FR GB JP US
Main International Patent Class: B28D-001/02
Publication Language: English
Fulltext Availability:
Detailed Description
Claims
Fulltext Word Count: 3014

US 4557744 not MFe, but no specifics of milling conditions

English Abstract
A method of machine cutting a semidense silicon comprising particulate body by relatively moving a substantially fully dense **silicon nitride cutting tool** against the body. The **silicon nitride** tool experiences increased tool life over that of carbides or tool steels heretofore used to machine cut low density, highly abrasive metals.

French Abstract
Procede de decoupage a la machine d'un corps de macroparticules comportant du silicium semi-dense par deplacement relatif d'un outil de coupe pour nitrure de silicium essentiellement entierement dense contre le corps. L'outil au nitrure de silicium possede une duree de vie amelioree par rapport a celle des carbures ou des aciers d'outils utilises jusqu'ici pour le decoupage a la machine de metaux fortement abrasifs de faible densite.

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Set     Items   Description
S1     315702   DRY OR NONLUBRIC? OR UNLUBRIC? OR (NON OR UN)()LUBRIC? OR -
            WITHOUT(3N)(CUTTING OR MACHINING OR MILLING)()(FLUID? OR LIQU-
            ID?)
S2     599906   MILLING OR BLUEPRINTING OR BLUE()PRINTING OR MACHINING OR -
            CUTTING
S3          4   DRYMILL? OR DRYMACHIN?
S4     890643   IRON? OR CASTIRON? OR ALUMINUM? OR ALUMINIUM? OR AL OR FE -
            OR FERROUS
S5      51624   (SILICO? OR SILICA? OR SILICI?)(2N)NITRID? OR SI3N4 OR SI(-
            )3()N()4 OR SI3()N4
S6      69758   (CUT OR CUTS OR CUTTER? OR CUTTING OR MILLING OR MACHINING-
            )(3N)(TOOL? OR INSERT? OR BIT OR BITS)
S7      76653   IC=(B23C? OR B23B?)
S8         60   WITHOUT(3N)(MACHIN? OR CUTTING OR MILLING)()(OIL OR OILS)
S9       1261   (S1 OR S8)(3N)S2 OR S3
S10        16   S9 AND S5
S11       182   S9 AND S4
S12        51   S11 AND S7
S13        45   S11 AND S6
S14         1   S11 AND S5(5N)S6
S15         7   S10 AND S11
S16        73   S10 OR S12:S15
S17        73   IDPAT (sorted in duplicate/non-duplicate order)
? show files
File 347:JAPIO Oct 1976-2003/Sep(Updated 040105)
         (c) 2004 JPO & JAPIO
File 350:Derwent WPIX 1963-2004/UD,UM &UP=200403
         (c) 2004  Thomson Derwent
```

17/3,K/2 **(Item 2 from file: 347)**
DIALOG(R)File 347:JAPIO


07371302
**DRY CUTTING** WORK METHOD OF Mg SYSTEM **ALUMINUM** ALLOY MATERIAL

PUB. NO.: 2002-239801 [JP 2002239801 A]
PUBLISHED: August 28, 2002 (20020828)
INVENTOR(s): AKAZAWA KOICHI
HARA NOBUHIRO
OZAKI KATSUHIKO
APPLICANT(s): KOBE STEEL LTD
APPL. NO.: 2001-044955 [JP 20011044955]
FILED: February 21, 2001 (20010221)

**DRY CUTTING** WORK METHOD OF Mg SYSTEM **ALUMINUM** ALLOY MATERIAL

INTL CLASS: **B23B-001/00**

ABSTRACT

PROBLEM TO BE SOLVED: To provide a **dry cutting** method of an Mg **aluminium** alloy material capable of providing an excellent working surface **without** using **cutting fluid** by a cemented carbide tool with WC as a main component on a surface of a cutting blade of which no coating film is formed.

SOLUTION: The Mg **aluminium** alloy material containing magnesium with **aluminium** as a main component is cut at a cutting speed of 800 m/min by ...

**17/3,K/7 (Item 7 from file: 350)**
DIALOG(R)File 350:Derwent WPIX


013036525
WPI Acc No: 2000-208377/200019
XRAM Acc No: C00-064379
XRPX Acc No: N00-155394
**Surface machining of hypereutectic** aluminum **-silicon alloy cylinder liner layer of reciprocating piston engine crankcase, involves** dry machining **using diamond-containing** cutting tool
Patent Assignee: DAIMLERCHRYSLER AG (DAIM )
Inventor: BECK M; HAUG T; IZQUIERDO P; LAHRES M; LINDEN P; MERKEL M; PFEFFINGER H
Number of Countries: 027 Number of Patents: 008
Patent Family:

| Patent No | Kind | Date | Applicat No | Kind | Date | Week |
|---|---|---|---|---|---|---|
| EP 985475 | A1 | 20000315 | EP 99115471 | A | 19990805 | 200019 B |
| DE 19924494 | A1 | 20000316 | DE 1024494 | A | 19990528 | 200021 |
| JP 2000104179 | A | 20000411 | JP 99281865 | A | 19990827 | 200029 |
| DE 19924494 | C2 | 20010621 | DE 1024494 | A | 19990528 | 200135 |
| US 20010023859 | A1 | 20010927 | US 99389388 | A | 19990903 | 200159 |
| | | | US 2001849828 | A | 20010507 | |
| EP 985475 | B1 | 20020306 | EP 99115471 | A | 19990805 | 200219 |
| DE 59900919 | G | 20020411 | DE 500919 | A | 19990805 | 200227 |
| | | | EP 99115471 | A | 19990805 | |
| US 6515254 | B2 | 20030204 | US 99389388 | A | 19990903 | 200313 |
| | | | US 2001849828 | A | 20010507 | |

Priority Applications (No Type Date): DE 1024494 A 19990528; DE 1040118 A 19980903
Patent Details:

| Patent No | Kind | Lan | Pg | Main IPC | Filing Notes |
|---|---|---|---|---|---|
| EP 985475 | A1 | G | 11 | B23B-027/14 | |
| Designated States (Regional): AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI | | | | | |
| DE 19924494 | A1 | | | B23P-009/00 | |
| JP 2000104179 | A | | 8 | C23C-026/00 | |
| DE 19924494 | C2 | | | B23P-009/00 | |
| US 20010023859 | A1 | | | B23K-026/38 | Cont of application US 99389388 |
| EP 985475 | B1 | G | | B23B-027/14 | |
| Designated States (Regional): DE ES FR GB IT SE | | | | | |
| DE 59900919 | G | | | B23B-027/14 | Based on patent EP 985475 |
| US 6515254 | B2 | | | B23K-026/00 | Cont of application US 99389388 |

**Surface machining of hypereutectic** aluminum **-silicon alloy cylinder liner layer of reciprocating piston engine crankcase, involves** dry machining **using diamond-containing** cutting tool

Abstract (Basic):
... Surface machining of a tribological hypereutectic **aluminum** -silicon alloy or an **aluminum** -silicon composite material layer, by one-step lubricant-free **dry machining** using a diamond-containing **cutting tool** , is new.
... Preferred Features: The **cutting tool** is a throwaway **cutter** tip made of polycrystalline diamond, single crystal diamond and/or a hard metal with a...

...Especially for post-machining of a hypereutectic **aluminum** -silicon alloy or an **aluminum** -silicon composite material cylinder liner layer of a crankcase of a reciprocating piston engine...

...Title Terms: **ALUMINIUM** ;
International Patent Class (Main): **B23B-027/14** ...

**17/3,K/12 (Item 12 from file: 350)**
DIALOG(R)File 350:Derwent WPIX


015661376
WPI Acc No: 2003-723563/200369
XRAM Acc No: C03-199320
XRPX Acc No: N03-578542
Cutting **tool** insert **for** dry milling **in alloyed steels, and** dry milling **in hardened steels, includes cemented carbide body comprising cobalt, tantalum and niobium, and tungsten carbide, and coating comprising titanium** aluminum **nitride**
Patent Assignee: SECO TOOLS AB (SECO-N)
Inventor: LARSSON A; SJOELEN J; SULIN A
Number of Countries: 033 Number of Patents: 004
Patent Family:

| Patent No | Kind | Date | Applicat No | Kind | Date | Week | |
|---|---|---|---|---|---|---|---|
| EP 1347076 | A1 | 20030924 | EP 20035967 | A | 20030318 | 200369 | B |
| SE 200200871 | A | 20030921 | SE 2002871 | A | 20020320 | 200377 | |
| CN 1445037 | A | 20031001 | CN 2003107347 | A | 20030320 | 200382 | |
| JP 2003326415 | A | 20031118 | JP 200364682 | A | 20030311 | 200401 | |

Priority Applications (No Type Date): SE 2002871 A 20020320
Patent Details:

| Patent No | Kind | Lan | Pg | Main IPC | Filing Notes |
|---|---|---|---|---|---|
| EP 1347076 | A1 | E | 12 | C23C-014/14 | |
| Designated States (Regional): AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LI LT LU LV MC MK NL PT RO SE SI SK TR | | | | | |
| SE 200200871 | A | | | B23B-027/14 | |
| CN 1445037 | A | | | B23C-005/00 | |
| JP 2003326415 | A | | 8 | B23C-005/16 | |

Cutting **tool** insert **for** dry milling **in alloyed steels, and** dry milling **in hardened steels, includes cemented carbide body comprising cobalt, tantalum and niobium, and tungsten carbide, and coating comprising titanium** aluminum **nitride**

Abstract (Basic):
... A **cutting tool insert** comprises a cemented carbide body comprising 7.9-8.6 wt.% (preferably 8-8.5...

...niobium, and a balance of tungsten carbide; and a coating comprising a layer of titanium **aluminum** nitride.
... A **cutting tool insert** comprises a cemented carbide body and a coating. The cemented carbide body comprises 7.9...

...An INDEPENDENT CLAIM is also included for a method for making a **cutting tool insert** by plasma vapor deposition technique...

...The tool is used for **dry milling** at high **cutting** speeds in alloyed steels, **tool** steels and **dry milling** in hardened steels (claimed ...

...The **tool** provides enhanced **cutting** performance at high cutting speeds, and improved wear properties...
Technology Focus:
... Preferred Component: The **cutting tool** has an outer layer of titanium nitride with a thickness of 0.1-2 microns...
...Title Terms: **ALUMINIUM** ;
International Patent Class (Main): **B23B-027/14**...

... **B23C-005/00** ...

... **B23C-005/16**
International Patent Class (Additional): **B23C-003/00** ...

17/3,K/32 (Item 32 from file: 350)
DIALOG(R)File 350:Derwent WPIX


013892629
WPI Acc No: 2001-376842/200140
XRAM Acc No: C01-115329
XRPX Acc No: N01-275838
Cutting tool insert **used for wet and** dry milling **of low and medium alloy**ed steels and stainless steels, comprises cemented carbide **body and coating**
Patent Assignee: SANDVIK AB (SANV ); SECO TOOLS AB (SECO-N)
Inventor: OLOFSSON R; QVICK J; RUPPI S; SULIN A
Number of Countries: 028 Number of Patents: 007
Patent Family:

| Patent No | Kind | Date | Applicat No | Kind | Date | Week | |
|---|---|---|---|---|---|---|---|
| EP 1103635 | A2 | 20010530 | EP 2000125483 | A | 20001121 | 200140 | B |
| SE 9904274 | A | 20010526 | SE 994274 | A | 19991125 | 200141 | |
| JP 2001205505 | A | 20010731 | JP 2000359158 | A | 20001127 | 200148 | |
| SE 200000667 | A | 20010830 | SE 2000667 | A | 20000229 | 200161 | |
| SE 519896 | C2 | 20030422 | SE 2000667 | A | 20000229 | 200334 | |
| SE 519903 | C2 | 20030422 | SE 994274 | A | 19991125 | 200334 | |
| US 6632514 | B1 | 20031014 | US 2000717006 | A | 20001122 | 200368 | |

Priority Applications (No Type Date): SE 2000667 A 20000229; SE 994274 A 19991125
Patent Details:

| Patent No | Kind | Lan | Pg | Main IPC | Filing Notes |
|---|---|---|---|---|---|
| EP 1103635 | A2 | E | 10 | C23C-030/00 | |
| Designated States (Regional): AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI TR | | | | | |
| SE 9904274 | A | | | C23C-028/00 | |
| JP 2001205505 | A | | 24 | B23B-027/14 | |
| SE 200000667 | A | | | C23C-030/00 | |
| SE 519896 | C2 | | | C23C-030/00 | |
| SE 519903 | C2 | | | C23C-030/00 | |
| US 6632514 | B1 | | | B32B-009/00 | |

Cutting tool insert **used for wet and** dry milling **of low and medium alloyed steels and stainless steels, comprises cemented carbide body and coating**

Abstract (Basic):
... A **cutting tool insert** comprises coating having a multi-layer coating with a thickness of 2-20 mum, 7...
... A **cutting tool insert** comprises a cemented carbide body and a coating. The coating includes a multi-layer coating...

...of 2 mum, 7 individual layers to 20 mum, 41 individual layers, composed of kappa- **aluminum** oxide (Al2O3)-layers with a thickness of 0.1-0.4, preferably 0.2-0...

...6-11.4). An INDEPENDENT CLAIM is also included for a method of making a **cutting tool insert** of the above invention...

...The invention is used for wet and **dry milling** of low and medium alloyed steels and stainless steels. It is also excellent for turning ...
Technology Focus:
... with a thickness of 0.5-2 mum and comprising TiN, TiC, titanium

oxide, (titanium, **aluminum** ) (carbon, oxygen) is deposited between the kappa-Al2O3 layers and TiN or TiC layers. Preferred...

...Preferred Property: The **cutting tool insert** has an S-value of 0.85-0.89.

International Patent Class (Main): **B23B-027/14** ...

International Patent Class (Additional): **B23C-005/16** ...

17/3,K/38 **(Item 38 from file: 350)**
DIALOG(R)File 350:Derwent WPIX


013395104
WPI Acc No: 2000-567042/200053
XRAM Acc No: C00-169058
**Coated cemented carbide** tool **for** cutting **steels has four layers with second layer including many sublayers of titanium** aluminum **nitride**
Patent Assignee: SANDVIK AB (SANV )
Inventor: AKESSON L; OESTLUND A; PERSSON J; SUNDTROEM R; SUNDSTROEM R
Number of Countries: 027 Number of Patents: 005
Patent Family:

| Patent No | Kind | Date | Applicat No | Kind | Date | Week | |
|---|---|---|---|---|---|---|---|
| EP 1038989 | A2 | 20000927 | EP 2000104777 | A | 20000315 | 200053 | B |
| JP 2000308916 | A | 20001107 | JP 200087368 | A | 20000327 | 200061 | |
| SE 9901149 | A | 20000927 | SE 991149 | A | 19990326 | 200063 | |
| US 6250855 | B1 | 20010626 | US 2000534006 | A | 20000324 | 200138 | |
| SE 519005 | C2 | 20021217 | SE 991149 | A | 19990326 | 200307 | |

Priority Applications (No Type Date): SE 991149 A 19990326
Patent Details:

| Patent No | Kind | Lan | Pg | Main IPC | Filing Notes |
|---|---|---|---|---|---|
| EP 1038989 | A2 | E | 9 | C23C-030/00 | |
| Designated States (Regional): AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI | | | | | |
| JP 2000308916 | A | | 6 | B23C-005/16 | |
| SE 9901149 | A | | | C23C-016/30 | |
| US 6250855 | B1 | | | B23B-027/14 | |
| SE 519005 | C2 | | | C23C-016/30 | |

**Coated cemented carbide** tool **for** cutting **steels has four layers with second layer including many sublayers of titanium** aluminum **nitride**

Abstract (Basic):
... Coated cemented carbide **cutting tool** has four layers of titanium **aluminum** nitride. The second layer comprises 12-25 sublayers with composition alternating between each layer. Thickness...
... Coated cemented carbide **cutting tool** has tungsten carbide-cobalt based body with 10-12 wt% Co, 0.3-0.6...

...The **cutting tool** is used for wet of **dry machining** of stainless steels of different composition and microstructure at high cutting speeds (claimed...
...Title Terms: **ALUMINIUM** ;
International Patent Class (Main): **B23C-005/16** ...
International Patent Class (Additional): **B23B-027/14** ...

17/3,K/42 **(Item 42 from file: 350)**
DIALOG(R)File 350:Derwent WPIX


010947951
WPI Acc No: 1996-444901/199645
XRAM Acc No: C96-140072
**A multi-coated** cutting insert **for** milling **grey cast** iron - **the insert consisting of a cemented carbide, the inner coatings being titanium carbides, nitrides or oxycarbonitrides and the outer coating being an alpha alumina**
Patent Assignee: SANDVIK AB (SANV )
Inventor: LJUNGBERG B; OLSSON B
Number of Countries: 013 Number of Patents: 012
Patent Family:

| Patent No | Kind | Date | Applicat No | Kind | Date | Week | |
|---|---|---|---|---|---|---|---|
| EP 736615 | A2 | 19961009 | EP 96850054 | A | 19960319 | 199645 | B |
| JP 8276305 | A | 19961022 | JP 96106417 | A | 19960404 | 199701 | |
| SE 9501286 | A | 19961006 | SE 951286 | A | 19950405 | 199701 | |
| EP 736615 | A3 | 19970312 | EP 96850054 | A | 19960319 | 199722 | |
| CN 1134470 | A | 19961030 | CN 96100514 | A | 19960403 | 199803 | |
| BR 9601258 | A | 19980106 | BR 961258 | A | 19960403 | 199810 | |
| IL 117494 | A | 19990312 | IL 117494 | A | 19960314 | 199923 | |
| US 5912051 | A | 19990615 | US 96616012 | A | 19960314 | 199930 | |
| | | | US 9834230 | A | 19980304 | | |
| EP 736615 | B1 | 19990818 | EP 96850054 | A | 19960319 | 199937 | |
| DE 69603765 | E | 19990923 | DE 603765 | A | 19960319 | 199945 | |
| | | | EP 96850054 | A | 19960319 | | |
| SE 514181 | C2 | 20010115 | SE 951286 | A | 19950405 | 200106 | |
| US 6333098 | B1 | 20011225 | US 96616012 | A | 19960314 | 200206 | |

Priority Applications (No Type Date): SE 951286 A 19950405
Patent Details:

| Patent No | Kind | Lan | Pg | Main IPC | Filing Notes |
|---|---|---|---|---|---|
| EP 736615 | A2 | E | 7 | C23C-030/00 | |
| Designated States (Regional): AT CH DE FR GB IT LI SE | | | | | |
| JP 8276305 | A | | 5 | B23B-027/14 | |
| SE 9501286 | A | | | C23C-016/30 | |
| EP 736615 | A3 | | | C23C-030/00 | |
| CN 1134470 | A | | | C23C-016/30 | |
| BR 9601258 | A | | | B22F-007/06 | |
| IL 117494 | A | | | C23C-030/00 | |
| US 5912051 | A | | | C23C-016/00 | Div ex application US 96616012 |
| EP 736615 | B1 | E | | C23C-030/00 | |
| Designated States (Regional): AT CH DE FR GB IT LI SE | | | | | |
| DE 69603765 | E | | | C23C-030/00 | Based on patent EP 736615 |
| SE 514181 | C2 | | | C23C-030/00 | |
| US 6333098 | B1 | | | C23C-016/36 | |

**A multi-coated** cutting insert **for** milling **grey cast** iron -

...Abstract (Basic): **Cutting insert** for **milling** of grey cast **iron** comprising a substrate and a coating. The substrate consists of WC, 3-15 wt.% Co...

...Also claimed is a method of making a **cutting insert** which involves coating a WC-Co-based substrate with the various layers identified above...

...USE - A coated **cutting tool** useful for **dry milling** of grey cast

**iron** .

...Title Terms: **IRON** ;
...International Patent Class (Main): **B23B-027/14**
International Patent Class (Additional): **B23C-005/16** ...

**17/3,K/46 (Item 46 from file: 350)**
DIALOG(R)File 350:Derwent WPIX


009306038
WPI Acc No: 1992-433447/199252
XRPX Acc No: N92-330783
**Coated indexable** cutting insert **for** milling **cast** iron - **has cemented tungsten carbide based composition forming substrate coated by two coatings of differing compositions**
Patent Assignee: KENNAMETAL INC (KENN )
Inventor: GODSE R V; SANTHANAM A T
Number of Countries: 021 Number of Patents: 013
Patent Family:

| Patent No | Kind | Date | Applicat No | Kind | Date | Week | |
|---|---|---|---|---|---|---|---|
| WO 9221472 | A1 | 19921210 | WO 92US2791 | A | 19920401 | 199252 | B |
| US 5188489 | A | 19930223 | US 91708422 | A | 19910531 | 199310 | |
| AU 9221675 | A | 19930108 | AU 9221675 | A | 19920401 | 199315 | |
| | | | WO 92US2791 | A | 19920401 | | |
| EP 587786 | A1 | 19940323 | EP 92913847 | A | 19920401 | 199412 | |
| | | | WO 92US2791 | A | 19920401 | | |
| ES 2050098 | T1 | 19940516 | EP 92913847 | A | 19920401 | 199423 | |
| JP 6505441 | W | 19940623 | WO 92US2791 | A | 19920401 | 199429 | |
| | | | JP 93500391 | A | 19920401 | | |
| AU 652655 | B | 19940901 | AU 9221675 | A | 19920401 | 199436 | |
| EP 587786 | A4 | 19940824 | EP 92913847 | A | 19920000 | 199533 | |
| CA 2105066 | C | 19960709 | CA 2105066 | A | 19920401 | 199638 | |
| EP 587786 | B1 | 19980930 | EP 92913847 | A | 19920401 | 199843 | |
| | | | WO 92US2791 | A | 19920401 | | |
| DE 69227190 | E | 19981105 | DE 627190 | A | 19920401 | 199850 | |
| | | | EP 92913847 | A | 19920401 | | |
| | | | WO 92US2791 | A | 19920401 | | |
| ES 2050098 | T3 | 19990116 | EP 92913847 | A | 19920401 | 199909 | |
| KR 138731 | B1 | 19980515 | KR 93703665 | A | 19931130 | 200014 | |

Priority Applications (No Type Date): US 91708422 A 19910531
Patent Details:

| Patent No | Kind | Lan | Pg | Main IPC | Filing Notes |
|---|---|---|---|---|---|
| WO 9221472 | A1 | E | 12 | B23C-005/20 | |
| Designated States (National): AU CA JP KR RU | | | | | |
| Designated States (Regional): AT BE CH DE DK ES FR GB GR IT LU MC NL SE | | | | | |
| US 5188489 | A | | 5 | B23C-005/20 | |
| AU 9221675 | A | | | B23C-005/20 | Based on patent WO 9221472 |
| EP 587786 | A1 | E | | B23C-005/20 | Based on patent WO 9221472 |
| Designated States (Regional): BE CH DE ES FR GB IT LI SE | | | | | |
| ES 2050098 | T1 | | | B23C-005/20 | Based on patent EP 587786 |
| JP 6505441 | W | | | B23B-027/14 | Based on patent WO 9221472 |
| AU 652655 | B | | | B23P-015/34 | Previous Publ. patent AU 9221675 |
| | | | | | Based on patent WO 9221472 |
| EP 587786 | B1 | E | | B23C-005/20 | Based on patent WO 9221472 |
| Designated States (Regional): BE CH DE ES FR GB IT LI SE | | | | | |
| DE 69227190 | E | | | B23C-005/20 | Based on patent EP 587786 |
| | | | | | Based on patent WO 9221472 |
| ES 2050098 | T3 | | | B23C-005/20 | Based on patent EP 587786 |
| KR 138731 | B1 | | | B23C-005/20 | |
| EP 587786 | A4 | | | B23C-005/20 | |
| CA 2105066 | C | | | B23C-005/20 | |

**Coated indexable** cutting insert **for** milling **cast** iron -

...Abstract (Basic): ADVANTAGE - High resistance to wear, thermal shock and chipping during wet milling of cast **iron** .

...Abstract (Equivalent): USE - a coated indexable **cutting** **insert** for wet and **dry** **milling** of cast **irons** .

...Title Terms: **IRON** ;
International Patent Class (Main): **B23B-027/14** ...

... **B23C-005/20**
International Patent Class (Additional): **B23B-027/16** ...

... **B23C-005/16**

17/3,K/52 **(Item 52 from file: 350)**
DIALOG(R)File 350:Derwent WPIX


004735284
WPI Acc No: 1986-238626/198636
XRAM Acc No: C86-102682
Silicon nitride cutting tool **contg. yttria, silica and alumina - exhibits reduced wear in** cutting **cast** iron dry **milled powder is pressed and sintered by conventional means to wear theoretical density**
Patent Assignee: GTE PROD CORP (SYLV )
Number of Countries: 001 Number of Patents: 001
Patent Family:

| Patent No | Kind | Date | Applicat No | Kind | Date | Week |
|---|---|---|---|---|---|---|
| US 4607017 | A | 19860819 | US 85746705 | A | 19850620 | 198636 B |

Priority Applications (No Type Date): US 85746705 A 19850620
Patent Details:

| Patent No | Kind | Lan | Pg | Main IPC | Filing Notes |
|---|---|---|---|---|---|
| US 4607017 | A | | 3 | | |

Silicon nitride cutting tool **contg. yttria, silica and alumina**...

...**exhibits reduced wear in** cutting **cast** iron dry **milled powder is pressed and sintered by conventional means to wear theoretical density**

...Abstract (Basic): Tool has compsn. (wt. %) 5 A1203, 6 Y203, 1.5-5.5 Si02 and balance **Si3N4** . Density is at least 99% theoretical...

...Si02 is generally present as impurity in **Si3N4** . Typically, powder is dry milled and then vibro-milled with 8-10% stearic acid; area...

...USE/ADVANTAGE - **Cutting tool** is for **machining** cast **iron** . Optimised A1203 content gives higher density than with lower addns. and better wear properties than...
...Title Terms: **IRON** ;

17/3,K/56 (Item 56 from file: 350)
DIALOG(R)File 350:Derwent WPIX


001596618
WPI Acc No: 1976-31023X/197617
**Superhard alloy for** cutting tools **- comprises metal carbide partially substd. by** nitride , silicide , **oxide, sulphide and or boride**
Patent Assignee: SUWA SEIKOSHA KK (SUWA )
Number of Countries: 001 Number of Patents: 002
Patent Family:

| Patent No | Kind | Date | Applicat No | Kind | Date | Week | |
|---|---|---|---|---|---|---|---|
| JP 51029306 | A | 19760312 | | | | 197617 | B |
| JP 76030004 | B | 19760828 | | | | 197639 | |

Priority Applications (No Type Date): JP 7124955 A 19710420

**Superhard alloy for** cutting tools - ...

...**comprises metal carbide partially substd. by** nitride , silicide , **oxide, sulphide and or boride**

...Abstract (Basic): A superhard alloy for **cutting tools** consisting of one or more carbides other than of vanadium and tungsten, and less than ...

...Hf, W, Cr, Mo etc., borides of Be, W, Cr, Ti, Zr etc., oxides of **Al** , Cr, Mg, Si, Be etc., and sulphides of **Fe** , Mo, Ce, La etc. Pref. applies to **dry cutting** or to materials such as stainless steels difficult to be machined, preventing heat wear of...

**17/3,K/65 (Item 65 from file: 347)**
DIALOG(R)File 347:JAPIO


06740257
HARD FILM COATED TOOL

PUB. NO.: 2000-326108 [JP 2000326108 A]
PUBLISHED: November 28, 2000 (20001128)
INVENTOR(s): INOUE KENICHI
APPLICANT(s): HITACHI TOOL ENGINEERING LTD
APPL. NO.: 11-138040 [JP 99138040]
FILED: May 19, 1999 (19990519)

INTL CLASS: **B23B-027/14** ; C23C-014/06

ABSTRACT
PROBLEM TO BE SOLVED: To meet a **dry** and high speed **cutting** by improving oxidation resistance without degrading abrasion resistance and adhesion of a conventional TiAlN film...

...of 10 to 60% of Si, less than 10% of one or more of B, **Al** , V, Cr, Y, Zr, Nb, Mo, Hf, Ta, and W, and Ti as remainder, and has **Si3N4** and Si existing in a compound as an independent phase. A (b) layer is made...
... of nitride, carbonitride, oxynitride, and oxycarbonitride composed in metal atomic % of 40 to 75% of **Al** , less than 10% of one or more of B, Si, V, Cr, Y, Zr, Nb...

**17/3,K/73 (Item 73 from file: 347)**
DIALOG(R)File 347:JAPIO


02329516 **Image available**
CERAMIC **CUTTING TOOL**

PUB. NO.: 62-246416 [JP 62246416 A]
PUBLISHED: October 27, 1987 (19871027)
INVENTOR(s): TAKAGI HAJIME
APPLICANT(s): TAKAGI SHOKAI KK [000000] (A Japanese Company or Corporation), JP (Japan)
APPL. NO.: 61-087437 [JP 8687437]
FILED: April 15, 1986 (19860415)
JOURNAL: Section: M, Section No. 685, Vol. 12, No. 120, Pg. 40, April 14, 1988 (19880414)

CERAMIC **CUTTING TOOL**

INTL CLASS: B23D-075/00; **B23B-051/00**

ABSTRACT
... cutting and shorten cutting time by engraving oil grooves on the shank part of a **cutting tool** such as a ceramic reamer, a ceramic drill and a ceramic end milling cutter...
... are made continuous to the cutter part 1. And in the case of cutting cast **iron** such as FC and FCD with a cemented carbide or a ceramic reamer, for example...

... application of high-speed cutting. In this way, cutting time and cost can be reduced **without** any splash of **cutting oil** and **cutting** precision and cutting surface roughness can be improved.

```
Set     Items   Description
S1         27   AU='DAHL K':AU='DAHL K J'
S2          5   AU='DAHL K L':AU='DAHL K P'
S3         14   AU='DAHL K P':AU='DAHL K W'
S4         14   AU='HESSMAN I':AU='HESSMAN INGEMAR'
S5         14   S1:S4 AND (MILLING OR MACHINING OR CUTTING)
? show files
File 347:JAPIO Oct 1976-2003/Sep(Updated 040105)
         (c) 2004 JPO & JAPIO
File 350:Derwent WPIX 1963-2004/UD,UM &UP=200403
         (c) 2004  Thomson Derwent
```

**5/3,K/1 (Item 1 from file: 347)**
DIALOG(R)File 347:JAPIO


07507682
CEMENTED CARBIDE **CUTTING** TOOL INSERT FOR TURNING PROCESSING TITANIUM ALLOY

PUB. NO.: 2003-001505 [JP 2003001505 A]
PUBLISHED: January 08, 2003 (20030108)
INVENTOR(s): **HESSMAN INGEMAR**
OLSSON BJORN
PETERSSON CARL-GORAN
APPLICANT(s): SECO TOOLS AB
APPL. NO.: 2002-101408 [JP 20022101408]
FILED: April 03, 2002 (20020403)
PRIORITY: 01 200101241 [SE 20011241], SE (Sweden), April 05, 2001 (20010405)

CEMENTED CARBIDE **CUTTING** TOOL INSERT FOR TURNING PROCESSING TITANIUM ALLOY

INVENTOR(s): **HESSMAN INGEMAR**
OLSSON BJORN
PETERSSON CARL-GORAN

ABSTRACT
...obtained with relation to turning processing parts of a titanium alloy.

SOLUTION: This cemented carbide **cutting** tool insert comprises Co of 5 to 7 by Wt% and WC in the remaining...

**5/3,K/2 (Item 2 from file: 347)**
DIALOG(R)File 347:JAPIO


07332027
**CUTTING** TOOL INSERT FOR **MILLING**

PUB. NO.: 2002-200516 [JP 2002200516 A]
PUBLISHED: July 16, 2002 (20020716)
INVENTOR(s): NORDGREN ANDERS
**HESSMAN INGEMAR**
MIKUS MARIAN
APPLICANT(s): SANDVIK AB
APPL. NO.: 2001-342915 [JP 20011342915]
FILED: November 08, 2001 (20011108)
PRIORITY: 00 200004079 [SE 20004079], SE (Sweden), November 08, 2000 (20001108)

**CUTTING** TOOL INSERT FOR **MILLING**

INVENTOR(s): NORDGREN ANDERS
**HESSMAN INGEMAR**
MIKUS MARIAN

ABSTRACT
PROBLEM TO BE SOLVED: To provide a **cutting** tool insert for coated **milling** in particular effective for **milling** of gray cast iron, regardless of the presence or absence of the outer skin of casting, at low

**cutting** speed or medium **cutting** speed and under a wetting condition and **milling** for nodular cast iron and CV graphite cast iron, regardless of the presence or absence of the outer skin of casting, at medium **cutting** speed and under the wetting condition.

SOLUTION: This **cutting** insert is characterized by having coating including a TiCxNy inside layer having WC-CO cemented...

**5/3,K/3 (Item 1 from file: 350)**
DIALOG(R)File 350:Derwent WPIX


015008699
WPI Acc No: 2003-069216/200307
XRAM Acc No: C03-018163
XRPX Acc No: N03-053794
**Cemented carbide** cutting **tool insert for turning of titanium alloys consists of cobalt and tungsten carbide and is at least partly covered with a thin layer of cobalt**
Patent Assignee: SANDVIK AB (SANV ); SECO TOOLS AB (SECO-N); HESSMAN I (HESS-I); OLSSON B (OLSS-I); PETERSSON C (PETE-I)
Inventor: **HESSMAN I** ; OLSSON B; PETERSSON C
Number of Countries: 029 Number of Patents: 004
Patent Family:

| Patent No | Kind | Date | Applicat No | Kind | Date | Week |
|---|---|---|---|---|---|---|
| EP 1247879 | A2 | 20021009 | EP 20027465 | A | 20020330 | 200307 B |
| US 20020174750 | A1 | 20021128 | US 2002112941 | A | 20020402 | 200307 |
| JP 2003001505 | A | 20030108 | JP 2002101408 | A | 20020403 | 200315 |
| KR 2002079468 | A | 20021019 | KR 200218445 | A | 20020404 | 200316 |

Priority Applications (No Type Date): SE 20011241 A 20010405
Patent Details:

| Patent No | Kind | Lan | Pg | Main IPC | Filing Notes |
|---|---|---|---|---|---|
| EP 1247879 | A2 | E | 3 | C23C-030/00 | |
| | Designated States (Regional): AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI TR | | | | |
| US 20020174750 | A1 | | | B23B-001/00 | |
| JP 2003001505 | A | | 3 | B23B-027/14 | |
| KR 2002079468 | A | | | B23P-015/28 | |

**Cemented carbide** cutting **tool insert for turning of titanium alloys consists of cobalt and tungsten carbide and is**...
Inventor: **HESSMAN I** ...

Abstract (Basic):
... Cemented carbide **cutting** tool insert for turning of titanium alloys consists of 5 - 7 wt.% cobalt and the...
... i) a method of making a cemented carbide **cutting** tool insert consisting of 5 - 7 wt.% cobalt and the remainder of tungsten carbide comprising...

...ii) method of turning titanium alloys using cemented carbide **cutting** tool insert consisting of 5 - 7 wt.% cobalt and remainder tungsten carbide under the following...

...primary land=0.05 - 0.25 mm, angle of primary land=-20 degrees - + 10 degrees; **cutting** speed=50 - 150 m/min; feed rate=0.3 - 0.6 mm; and **cutting** depth=0.5 - 10 mm...

...The **cutting** tool insert is used for **machining** of titanium alloys used for aircrafts and gas turbine engines...

...The **cutting** tool insert has increased tool life and productivity...

**5/3,K/4 (Item 2 from file: 350)**



014615338
WPI Acc No: 2002-436042/200246
XRAM Acc No: C02-123919
XRPX Acc No: N02-343243

**Engine block** milling **method for passenger car, involves using silicon nitride** cutting **tool insert having specific** cutting **speed, feed length,** cutting **depth and thickness**

Patent Assignee: SANDVIK AB (SANV ); DAHL K (DAHL-I); HESSMAN I (HESS-I)
Inventor: **DAHL K ; HESSMAN I**

Number of Countries: 030 Number of Patents: 006
Patent Family:

| Patent No | Kind | Date | Applicat No | Kind | Date | Week |
|---|---|---|---|---|---|---|
| WO 200242027 | A1 | 20020530 | WO 2001SE2532 | A | 20011114 | 200246 B |
| US 20020076286 | A1 | 20020620 | US 2001987941 | A | 20011116 | 200247 |
| SE 200004274 | A | 20020523 | SE 20004274 | A | 20001122 | 200252 |
| SE 520252 | C2 | 20030617 | SE 20004274 | A | 20001122 | 200346 |
| EP 1335807 | A1 | 20030820 | EP 2001983887 | A | 20011114 | 200362 |
| | | | WO 2001SE2532 | A | 20011114 | |
| KR 2003045860 | A | 20030611 | KR 2003706860 | A | 20030521 | 200370 |

Priority Applications (No Type Date): SE 20004274 A 20001122
Patent Details:

| Patent No | Kind | Lan | Pg | Main IPC | Filing Notes |
|---|---|---|---|---|---|
| WO 200242027 | A1 | E | 9 | B23C-003/00 | |
| Designated States (National): IL JP KR | | | | | |
| Designated States (Regional): AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE TR | | | | | |
| US 20020076286 | A1 | | | B23C-001/00 | |
| SE 200004274 | A | | | B23C-003/00 | |
| SE 520252 | C2 | | | B23C-003/00 | |
| EP 1335807 | A1 | E | | B23C-003/00 | Based on patent WO 200242027 |
| Designated States (Regional): AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI TR | | | | | |
| KR 2003045860 | A | | | B23C-003/00 | |

**Engine block** milling **method for passenger car, involves using silicon nitride** cutting **tool insert having specific** cutting **speed, feed length,** cutting **depth and thickness**

Inventor: **DAHL K** ...

... **HESSMAN I**

Abstract (Basic):
... engine block made up of aluminum and cast iron liner, is milled using silicon nitride **cutting** tool insert having **cutting** speed of 1000-3000 m/min, **cutting** feed length of 0.05-0.5 mm and **cutting** depth of 0.2-2mm. The insert thickness is 0.09-0.17 mm.
... For **milling** engine blocks of passenger car...

...higher productivity, long tool life and less frequent tool changes

because of the silicon nitride **cutting** tool insert...

**5/3,K/5 (Item 3 from file: 350)**
DIALOG(R)File 350:Derwent WPIX


014598136
WPI Acc No: 2002-418840/200245
XRAM Acc No: C02-118331
Cutting **tool insert comprises cemented carbide body with specified amounts of tungsten carbide, cobalt, cubic carbides of tantalum and niobium, and highly tungsten-alloyed binder phase with specified tungsten carbide ratio**
Patent Assignee: SANDVIK AB (SANV ); HESSMAN I (HESS-I); MIKUS M (MIKU-I); NORDGREN A (NORD-I)
Inventor: **HESSMAN** I ; MIKUS M; NORDGREN A
Number of Countries: 028 Number of Patents: 006
Patent Family:

| Patent No | Kind | Date | Applicat No | Kind | Date | Week | |
|---|---|---|---|---|---|---|---|
| EP 1205569 | A2 | 20020515 | EP 2001850176 | A | 20011025 | 200245 | B |
| US 20020081432 | A1 | 20020627 | US 2001984145 | A | 20011029 | 200245 | |
| SE 200004079 | A | 20020509 | SE 20004079 | A | 20001108 | 200250 | |
| JP 2002200516 | A | 20020716 | JP 2001342915 | A | 20011108 | 200261 | |
| SE 519250 | C2 | 20030204 | SE 20004079 | A | 20001108 | 200317 | |
| US 6638609 | B2 | 20031028 | US 2001984145 | A | 20011029 | 200372 | |

Priority Applications (No Type Date): SE 20004079 A 20001108
Patent Details:

| Patent No | Kind | Lan | Pg | Main IPC | Filing Notes |
|---|---|---|---|---|---|
| EP 1205569 | A2 | E | 8 | C22C-029/08 | |
| | Designated States (Regional): AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI TR | | | | |
| US 20020081432 | A1 | | | B32B-009/00 | |
| SE 200004079 | A | | | C23C-030/00 | |
| JP 2002200516 | A | | 7 | B23C-005/16 | |
| SE 519250 | C2 | | | C23C-016/30 | |
| US 6638609 | B2 | | | C23C-016/30 | |

Cutting **tool insert comprises cemented carbide body with specified amounts of tungsten carbide, cobalt, cubic carbides**...
Inventor: **HESSMAN** I ...

Abstract (Basic):
... A **cutting** tool insert comprises a cemented carbide body with (wt.%) tungsten carbide, cobalt (7.3-7...
... A **cutting** tool insert comprises a cemented carbide body and a coating. The cemented carbide body comprises...

...An INDEPENDENT CLAIM is included for a method of making a **milling** insert of the above invention comprising depositing by a chemical vapor deposition-method a first...

...For wet **milling** using fluid coolant of grey cast iron, compacted graphite iron and nodular iron particularly grey cast iron at a **cutting** speed of 70-180 m/min and a feed of 0.1-0.4 mm/tooth depending on **cutting** speed and insert geometry (claimed...

...The invention shows improved **cutting** performance...
Technology Focus:

... carbides of Ta and Nb. Preferred Method: The outermost TiN-layer is removed along the **cutting** edge.

**5/3,K/6 (Item 4 from file: 350)**
DIALOG(R)File 350:Derwent WPIX


013607604 **Image available**
WPI Acc No: 2001-091812/200110
XRAM Acc No: C01-027159

**Fixturing cutting tool inserts in a physical vapor deposition coating equipment involves placing the cutting tool insert made of non-magnetic material around alternating discs of magnet and iron, on an outer wall of a solid tube**

Patent Assignee: SANDVIK AB (SANV )
Inventor: **HESSMAN I** ; NORRGRANN T
Number of Countries: 022 Number of Patents: 005
Patent Family:

| Patent No | Kind | Date | Applicat No | Kind | Date | Week | |
|---|---|---|---|---|---|---|---|
| WO 200102620 | A1 | 20010111 | WO 2000SE1416 | A | 20000704 | 200110 | B |
| SE 9902574 | A | 20010106 | SE 992574 | A | 19990705 | 200116 | |
| SE 514666 | C2 | 20010402 | SE 992574 | A | 19990705 | 200121 | |
| EP 1203105 | A1 | 20020508 | EP 2000946702 | A | 20000704 | 200238 | |
| | | | WO 2000SE1416 | A | 20000704 | | |
| JP 2003504510 | W | 20030204 | WO 2000SE1416 | A | 20000704 | 200320 | |
| | | | JP 2001508389 | A | 20000704 | | |

Priority Applications (No Type Date): SE 992574 A 19990705
Patent Details:

| Patent No | Kind | Lan | Pg | Main IPC | Filing Notes |
|---|---|---|---|---|---|
| WO 200102620 | A1 | E | 13 | C23C-014/60 | |
| Designated States (National): IL JP US | | | | | |
| Designated States (Regional): AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE | | | | | |
| SE 9902574 | A | | | C23C-014/50 | |
| SE 514666 | C2 | | | C23C-014/50 | |
| EP 1203105 | A1 | E | | C23C-002/00 | Based on patent WO 200102620 |
| Designated States (Regional): AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE | | | | | |
| JP 2003504510 | W | | 13 | C23C-014/50 | Based on patent WO 200102620 |

**Fixturing cutting tool inserts in a physical vapor deposition coating equipment involves placing the cutting tool insert made of non-magnetic material around alternating discs of magnet and iron, on...**

Inventor: **HESSMAN I** ...

Abstract (Basic):
... **Cutting** tool inserts are fixed in a physical vapor deposition coating equipment by positioning the **cutting** tool inserts on the outer wall of the solid tube. The **cutting** inserts are made of non-magnetic metallic material (A) around alternating discs of magnets (B
... For fixturing **cutting** tool inserts in a physical vapor deposition coating equipment...

...The figure shows the **cutting** tool insert...
Technology Focus:
... Preferred Property: The wall of the **cutting** tool insert is less than 1.5 mm (preferably less than 1.0 mm) thick...

5/3,K/7 (Item 5 from file: 350)
DIALOG(R)File 350:Derwent WPIX


010443319 **Image available**
WPI Acc No: 1995-344638/199544
XRAM Acc No: C95-151507
**CVD coating of** cutting **tool inserts - allows full coating of inserts and batch loading system**
Patent Assignee: SANDVIK AB (SANV )
Inventor: **HESSMAN I** ; LJUNGBERG B; NORRGRANN T; PALSSON K
Number of Countries: 020 Number of Patents: 010
Patent Family:

| Patent No | Kind | Date | Applicat No | Kind | Date | Week | |
|---|---|---|---|---|---|---|---|
| WO 9525829 | A1 | 19950928 | WO 95SE276 | A | 19950317 | 199544 | B |
| SE 9400950 | A | 19950919 | SE 94950 | A | 19940318 | 199548 | |
| US 5576058 | A | 19961119 | US 95405782 | A | 19950317 | 199701 | |
| EP 750688 | A1 | 19970102 | EP 95913951 | A | 19950317 | 199706 | |
| | | | WO 95SE276 | A | 19950317 | | |
| JP 9510507 | W | 19971021 | JP 95524579 | A | 19950317 | 199801 | |
| | | | WO 95SE276 | A | 19950317 | | |
| US 5759621 | A | 19980602 | US 95405782 | A | 19950317 | 199829 | |
| | | | US 96703966 | A | 19960828 | | |
| EP 750688 | B1 | 19980812 | EP 95913951 | A | 19950317 | 199836 | |
| | | | WO 95SE276 | A | 19950317 | | |
| IL 113015 | A | 19980816 | IL 113015 | A | 19950316 | 199840 | |
| DE 69504045 | E | 19980917 | DE 604045 | A | 19950317 | 199843 | |
| | | | EP 95913951 | A | 19950317 | | |
| | | | WO 95SE276 | A | 19950317 | | |
| SE 509984 | C2 | 19990329 | SE 94950 | A | 19940318 | 199919 | |

Priority Applications (No Type Date): SE 94950 A 19940318
Patent Details:

| Patent No | Kind | Lan | Pg | Main IPC | Filing Notes |
|---|---|---|---|---|---|
| WO 9525829 | A1 | E | 15 | C23C-016/44 | |
| Designated States (National): JP | | | | | |
| Designated States (Regional): AT BE CH DE DK ES FR GB GR IE IT LU MC NL PT SE | | | | | |
| US 5576058 | A | | 7 | C23C-016/00 | |
| EP 750688 | A1 | E | | C23C-016/44 | Based on patent WO 9525829 |
| Designated States (Regional): AT CH DE FR GB IT LI SE | | | | | |
| JP 9510507 | W | | 14 | C23C-016/44 | Based on patent WO 9525829 |
| US 5759621 | A | | | C23C-016/44 | Cont of application US 95405782 |
| | | | | | Cont of patent US 5576058 |
| EP 750688 | B1 | E | | C23C-016/44 | Based on patent WO 9525829 |
| Designated States (Regional): AT CH DE FR GB IT LI SE | | | | | |
| DE 69504045 | E | | | C23C-016/44 | Based on patent EP 750688 |
| | | | | | Based on patent WO 9525829 |
| SE 9400950 | A | | | C23C-016/44 | |
| IL 113015 | A | | | C23C-016/00 | |
| SE 509984 | C2 | | | C23C-016/00 | |

**CVD coating of** cutting **tool inserts**...
Inventor: **HESSMAN I** ...

...Abstract (Basic): A method of coating **cutting** tool inserts by chemical vapour deposition is disclosed. The inserts rest on a peg attached...

...USE - For automatic batch CVD loading of **cutting** tool inserts...

...Abstract (Equivalent): A method of coating **cutting** tool inserts by CVD comprising...

**5/3,K/8 (Item 6 from file: 350)**
DIALOG(R)File 350:Derwent WPIX


010362436 **Image available**
WPI Acc No: 1995-263750/199534
XRPX Acc No: N95-202754
**Indexable insert for finish** milling **and cutter body - has two plane-parallel equal chip or main surfaces which are turned 90 deg. relative to each other, with each main surface comprising four operative** cutting **corners**
Patent Assignee: SANDVIK AB (SANV )
Inventor: **HESSMAN I** ; ROMAN S
Number of Countries: 023 Number of Patents: 014
Patent Family:

| Patent No | Kind | Date | Applicat No | Kind | Date | Week | |
|---|---|---|---|---|---|---|---|
| WO 9519238 | A1 | 19950720 | WO 95SE33 | A | 19950113 | 199534 | B |
| SE 9400081 | A | 19950715 | SE 9481 | A | 19940114 | 199539 | |
| SE 9402983 | A | 19960307 | SE 942983 | A | 19940906 | 199621 | |
| EP 739258 | A1 | 19961030 | EP 95907174 | A | 19950113 | 199648 | |
| | | | WO 95SE33 | A | 19950113 | | |
| SE 504151 | C2 | 19961125 | SE 942983 | A | 19940906 | 199702 | |
| SE 504196 | C2 | 19961202 | SE 9481 | A | 19940114 | 199703 | |
| JP 9507438 | W | 19970729 | JP 95518983 | A | 19950113 | 199740 | |
| | | | WO 95SE33 | A | 19950113 | | |
| KR 97700085 | A | 19970108 | WO 95SE33 | A | 19950113 | 199801 | |
| | | | KR 96703792 | A | 19960713 | | |
| CN 1138837 | A | 19961225 | CN 95191212 | A | 19950113 | 199806 | |
| EP 739258 | B1 | 19980603 | EP 95907174 | A | 19950113 | 199826 | |
| | | | WO 95SE33 | A | 19950113 | | |
| DE 69502808 | E | 19980709 | DE 602808 | A | 19950113 | 199833 | |
| | | | EP 95907174 | A | 19950113 | | |
| | | | WO 95SE33 | A | 19950113 | | |
| US 5957629 | A | 19990928 | WO 95SE33 | A | 19950113 | 199947 | |
| | | | US 96669538 | A | 19960906 | | |
| RU 2125925 | C1 | 19990210 | WO 95SE33 | A | 19950113 | 200021 | |
| | | | RU 96117008 | A | 19950113 | | |
| KR 344370 | B | 20020918 | WO 95SE33 | A | 19950113 | 200317 | |
| | | | KR 96703792 | A | 19960713 | | |

Priority Applications (No Type Date): SE 942983 A 19940906; SE 9481 A 19940114
Patent Details:

| Patent No | Kind | Lan | Pg | Main IPC | Filing Notes |
|---|---|---|---|---|---|
| WO 9519238 | A1 | E | 20 | B23C-005/20 | |
| Designated States (National): CA CN JP KR PL RU US | | | | | |
| Designated States (Regional): AT BE CH DE DK ES FR GB GR IE IT LU MC NL PT SE | | | | | |
| SE 9400081 | A | | | B23C-005/20 | |
| SE 9402983 | A | | | B23C-005/20 | |
| EP 739258 | A1 | E | 20 | B23C-005/20 | Based on patent WO 9519238 |
| Designated States (Regional): DE FR GB IT | | | | | |
| SE 504151 | C2 | | | B23C-005/20 | |
| SE 504196 | C2 | | | B23C-005/06 | |
| JP 9507438 | W | | 22 | B23C-005/20 | Based on patent WO 9519238 |
| KR 97700085 | A | | | B23C-005/20 | Based on patent WO 9519238 |
| CN 1138837 | A | | | B23C-005/20 | |

EP 739258 B1 E B23C-005/20 Based on patent WO 9519238
Designated States (Regional): DE FR GB IT
DE 69502808 E B23C-005/20 Based on patent EP 739258
Based on patent WO 9519238
US 5957629 A B32B-027/16 Based on patent WO 9519238
RU 2125925 C1 B23C-005/20
KR 344370 B B23C-005/20 Previous Publ. patent KR 97700085
Based on patent WO 9519238

**Indexable insert for finish** milling **and cutter body...**

**...are turned 90 deg. relative to each other, with each main surface comprising four operative** cutting **corners**
Inventor: **HESSMAN** I ...

...Abstract (Basic): The double-sided **milling cutting** insert of a square shape comprises two similar main surfaces and four similar side surfaces...

...Each of the two main surfaces comprises four operative **cutting** corners and that in connection to each **cutting** corner are two bevelled surfaces which are both angled relative to the plane of the...

...USE/ADVANTAGE - Provides **milling cutting** insert that reduces size and number of edge chippings to minimum and which achieves fine and smooth surfaces also on thin-walled workpieces. Further reduces axial pressure of **milling** tool against workpiece and minimises costs for production of **milling cutting** insert.

**5/3,K/9 (Item 7 from file: 350)**
DIALOG(R)File 350:Derwent WPIX
(c) 2004 Thomson Derwent. All rts. reserv.

010082193 **Image available**
WPI Acc No: 1994-349906/199444
XRPX Acc No: N94-274547
Milling **cutter body and tool - comprises number of cassettes, with** cutting **inserts fixed in cutter body by screws**
Patent Assignee: SANDVIK AB (SANV )
Inventor: ALMERSAND A; **HESSMAN I** ; AKE A; INGEMAR H
Number of Countries: 019 Number of Patents: 006
Patent Family:

| Patent No | Kind | Date | Applicat No | Kind | Date | Week | |
|---|---|---|---|---|---|---|---|
| CA 2119187 | A | 19940919 | CA 2119187 | A | 19940316 | 199444 | B |
| BR 9401189 | A | 19941018 | BR 941189 | A | 19940316 | 199444 | |
| EP 624415 | A1 | 19941117 | EP 94850032 | A | 19940228 | 199444 | |
| SE 9300889 | A | 19940919 | SE 93889 | A | 19930318 | 199444 | |
| AU 9456358 | A | 19940922 | AU 9456358 | A | 19940225 | 199445 | |
| CN 1102146 | A | 19950503 | CN 94102933 | A | 19940316 | 199725 | |

Priority Applications (No Type Date): SE 93889 A 19930318
Patent Details:

| Patent No | Kind | Lan | Pg | Main IPC | Filing Notes |
|---|---|---|---|---|---|
| CA 2119187 | A | | 11 | B23C-005/00 | |
| EP 624415 | A1 | E | 6 | B23C-005/00 | |
| Designated States (Regional): AT BE CH DE DK ES FR GB IE IT LI LU NL PT SE | | | | | |
| AU 9456358 | A | | 14 | B02C-018/18 | |
| BR 9401189 | A | | | B23C-005/04 | |

SE 9300889 A B23C-005/06
CN 1102146 A B23C-005/20

Milling **cutter body and tool...**

**...comprises number of cassettes, with** cutting **inserts fixed in cutter body by screws**
...Inventor: **HESSMAN I**

...Abstract (Basic): The **milling** cutter body of cylindrical basic shape comprises an upper side, a lower side and a...

...surface are provided a number of recesses or grooves (3) for carrying cassettes (4) with **cutting** inserts, and chip pockets between the cassettes. The chip pockets (8) are substantially rotation-symmetrically...

**5/3,K/10 (Item 8 from file: 350)**
DIALOG(R)File 350:Derwent WPIX


010049044 **Image available**
WPI Acc No: 1994-316755/199439
XRPX Acc No: N94-248745
**Face** milling **cutter tool for chip-breaking** machining **- has rotatable cutter with insert carrying inserts fastened in cutter body by screws with fine adjustment accomplished by turning eccentric tap**
Patent Assignee: SANDVIK AB (SANV )
Inventor: ALMERSAND A; **HESSMAN I**
Number of Countries: 028 Number of Patents: 021
Patent Family:

| Patent No | Kind | Date | Applicat No | Kind | Date | Week | |
|---|---|---|---|---|---|---|---|
| WO 9421411 | A1 | 19940929 | WO 94SE245 | A | 19940318 | 199439 | B |
| SE 9300888 | A | 19940919 | SE 93888 | A | 19930318 | 199442 | |
| AU 9463890 | A | 19941011 | AU 9463890 | A | 19940318 | 199504 | |
| SE 501915 | B | 19950619 | SE 93888 | A | 19930318 | 199530 | |
| FI 9504361 | A | 19950915 | WO 94SE245 | A | 19940318 | 199548 | |
| | | | FI 954361 | A | 19950915 | | |
| NO 9503663 | A | 19950915 | WO 94SE245 | A | 19940318 | 199549 | |
| | | | NO 953663 | A | 19950915 | | |
| EP 689489 | A1 | 19960103 | EP 94911347 | A | 19940318 | 199606 | |
| | | | WO 94SE245 | A | 19940318 | | |
| BR 9406588 | A | 19960102 | BR 946588 | A | 19940318 | 199610 | |
| | | | WO 94SE245 | A | 19940318 | | |
| JP 8507725 | W | 19960820 | JP 94520945 | A | 19940318 | 199702 | |
| | | | WO 94SE245 | A | 19940318 | | |
| AU 680889 | B | 19970814 | AU 9463890 | A | 19940318 | 199741 | |
| US 5667343 | A | 19970916 | WO 94SE245 | A | 19940318 | 199743 | |
| | | | US 95513960 | A | 19951102 | | |
| CN 1119420 | A | 19960327 | CN 94191496 | A | 19940318 | 199744 | |
| NO 301810 | B1 | 19971215 | WO 94SE245 | A | 19940318 | 199806 | |
| | | | NO 953663 | A | 19950915 | | |
| EP 689489 | B1 | 19980513 | EP 94911347 | A | 19940318 | 199823 | |
| | | | WO 94SE245 | A | 19940318 | | |
| DE 69410252 | E | 19980618 | DE 610252 | A | 19940318 | 199830 | |
| | | | EP 94911347 | A | 19940318 | | |
| | | | WO 94SE245 | A | 19940318 | | |
| ES 2118395 | T3 | 19980916 | EP 94911347 | A | 19940318 | 199848 | |
| RU 2111092 | C1 | 19980520 | RU 95117952 | A | 19940318 | 199850 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| CA 2156270 | C | 20010717 | CA 2156270 | A | 19940318 | 200144 |
| | | | WO 94SE245 | A | 19940318 | |
| KR 299473 | B | 20011122 | WO 94SE245 | A | 19940318 | 200243 |
| | | | KR 95703944 | A | 19950916 | |
| FI 112179 | B1 | 20031114 | WO 94SE245 | A | 19940318 | 200377 |
| | | | FI 954361 | A | 19950915 | |
| JP 3474572 | B2 | 20031208 | JP 94520945 | A | 19940318 | 200401 |
| | | | WO 94SE245 | A | 19940318 | |

Priority Applications (No Type Date): SE 93888 A 19930318
Patent Details:

| Patent No | Kind | Lan | Pg | Main IPC | Filing Notes |
|---|---|---|---|---|---|
| WO 9421411 | A1 | E | 12 | B23C-005/06 | |
| Designated States (National): AU BR CA CN FI JP KR NO PL RU US | | | | | |
| Designated States (Regional): AT BE CH DE DK ES FR GB GR IE IT LU MC NL PT SE | | | | | |
| SE 9300888 | A | | | B23C-005/24 | |
| AU 9463890 | A | | | B23C-005/06 | Based on patent WO 9421411 |
| SE 501915 | B | | | B23C-005/24 | |
| FI 9504361 | A | | | B23C-000/00 | |
| NO 9503663 | A | | | B23C-005/06 | |
| EP 689489 | A1 | E | 12 | B23C-005/06 | Based on patent WO 9421411 |
| Designated States (Regional): AT BE CH DE DK ES FR GB IE IT LI LU NL PT SE | | | | | |
| BR 9406588 | A | | | B23C-005/06 | Based on patent WO 9421411 |
| JP 8507725 | W | | 18 | B23C-005/24 | Based on patent WO 9421411 |
| AU 680889 | B | | | B23C-005/06 | Previous Publ. patent AU 9463890<br>Based on patent WO 9421411 |
| US 5667343 | A | | 7 | B23C-005/24 | Based on patent WO 9421411 |
| CN 1119420 | A | | | B23C-005/06 | |
| NO 301810 | B1 | | | B23C-005/06 | Previous Publ. patent NO 9503663 |
| EP 689489 | B1 | E | 9 | B23C-005/06 | Based on patent WO 9421411 |
| Designated States (Regional): AT BE CH DE DK ES FR GB IE IT LI LU NL PT SE | | | | | |
| DE 69410252 | E | | | B23C-005/06 | Based on patent EP 689489<br>Based on patent WO 9421411 |
| ES 2118395 | T3 | | | B23C-005/06 | Based on patent EP 689489 |
| RU 2111092 | C1 | | | B23C-005/06 | |
| CA 2156270 | C | E | | B23C-005/06 | Based on patent WO 9421411 |
| KR 299473 | B | | | B23C-005/06 | Previous Publ. patent KR 96700848<br>Based on patent WO 9421411 |
| FI 112179 | B1 | | | B23C-005/06 | Previous Publ. patent FI 9504361 |
| JP 3474572 | B2 | | 6 | B23C-005/24 | Previous Publ. patent JP 8507725<br>Based on patent WO 9421411 |

**Face** milling **cutter tool for chip-breaking** machining -
...Inventor: **HESSMAN I**

...Abstract (Basic): A **milling** cutter tool comprises a rotatable **milling** cutter body (1) and **cutting** insert-carrying cassettes (4) which are fastened in the cutter body by screws (6, 7...

...of the cassette are elongate in order to enable an axial fine-adjustment of the **cutting** edges...

...USE/ADVANTAGE - Provides multi-toothed **milling** cutter that enables very precise axial positioning of **cutting** edges with as few separate parts as possible and to obtain absolutely play-free fastening...
...Abstract (Equivalent): **Milling** cutter tool for chip-breaking **machining** comprising...

...a **milling** cutter body which is rotatable in a direction of rotation and includes a plurality of grooves at a periphery of the **milling** cutter body...

...a plurality of **cutting** insert-carrying cassettes, each cassette received in one of the plurality of grooves at the periphery of the **milling** cutter body and being fastened in the groove by two fastening screws, and each of...

...on a side of the cassette that faces towards an axis of rotation of the **milling** cutter tool, which recess is substantially perpendicular to the axis of rotation of the **milling** cutter tool
...Title Terms: **MACHINING** ;

**5/3,K/11 (Item 9 from file: 350)**
DIALOG(R)File 350:Derwent WPIX


008000686 **Image available**
WPI Acc No: 1989-265798/198937
XRPX Acc No: N89-202678
Milling **cutter - has adjuster rotatably connected to support to provide displacement of** cutting **insert**
Patent Assignee: SANDVIK AB (SANV )
Inventor: HESSMAN A B I; NYSTROEM L R; **HESSMAN I** ; NYSTROEM L; NYSTROM L
Number of Countries: 011 Number of Patents: 011
Patent Family:

| Patent No | Kind | Date | Applicat No | Kind | Date | Week |
|---|---|---|---|---|---|---|
| EP 332596 | A | 19890913 | EP 89850059 | A | 19890221 | 198937 B |
| SE 8800873 | A | 19890912 | | | | 198944 |
| BR 8901096 | A | 19891031 | | | | 198949 |
| SE 460772 | B | 19891120 | | | | 198949 |
| US 4938638 | A | 19900703 | US 89313992 | A | 19890223 | 199029 |
| CN 1035786 | A | 19890927 | | | | 199030 |
| EP 332596 | B1 | 19920819 | EP 89850059 | A | 19890221 | 199234 |
| DE 68902495 | E | 19920924 | DE 602495 | A | 19890221 | 199240 |
| | | | EP 89850059 | A | 19890221 | |
| ES 2034760 | T3 | 19930401 | EP 89850059 | A | 19890221 | 199323 |
| KR 9201229 | B1 | 19920208 | KR 892983 | A | 19890311 | 199342 |
| CA 1330617 | C | 19940712 | CA 591352 | A | 19890217 | 199431 |

Priority Applications (No Type Date): SE 88873 A 19880311
Patent Details:

| Patent No | Kind | Lan | Pg | Main IPC | Filing Notes |
|---|---|---|---|---|---|
| EP 332596 | A | E | 9 | | |
| Designated States (Regional): DE ES FR GB IT SE | | | | | |
| EP 332596 | B1 | E | 12 | B23C-005/24 | |
| Designated States (Regional): DE ES FR GB IT SE | | | | | |
| DE 68902495 | E | | | B23C-005/24 | Based on patent EP 332596 |
| ES 2034760 | T3 | | | B23C-005/24 | Based on patent EP 332596 |
| KR 9201229 | B1 | | | B23C-005/24 | |
| CA 1330617 | C | | | B23C-005/24 | |

Milling **cutter**...

...**has adjuster rotatably connected to support to provide displacement of** cutting **insert**
...Inventor: **HESSMAN I**

...Abstract (Basic): The device is equipped with adjustable **cutting** inserts (42). The **milling** cutter consists of a tool body having peripheral recesses (11). Each recess is adapted to...

...wedge (38), a screw (39), a support element (22) an adjustment element (29) and a **cutting** insert (42...

...The adjustment element is rotatably connected to the support element to provide displacement of the **cutting** insert, which abuts against the element in a direction away from the adjustment element. The...

...USE - A **milling** cutter for chip **machining** .

...Abstract (Equivalent): **Milling** cutter with indexable **cutting** inserts comprising a cutter body (10) having multiple peripheral recesses (11), each said recess being adapted to receive an adjustment element (29) and a **cutting** insert (42) which are in abutment with each other, said adjustment element having a central

...Abstract (Equivalent): The **milling** cutter for chip **machining** is equipped with adjustable **cutting** inserts. The **milling** cutter comprises a tool body having a number of peripheral recesses. Each recess is adapted to receive a **cutting** insert, a support element for defining a support surface against which the insert abuts, an adjusting element for adjusting the position of the **cutting** insert in a first direction, and a wedge for securing the insert...

**5/3,K/12 (Item 10 from file: 350)**



007874444 **Image available**
WPI Acc No: 1989-139556/198919
XRPX Acc No: N89-106557

Cutting **insert for chip removing** machining - **has rake face and clearance face forming** cutting **edge with ridges on rake face connected to** cutting **edge**

Patent Assignee: SANDVIK AB (SANV )
Inventor: HESSMAN A B I; NYSTROEM L R; **HESSMAN I** ; NYSTROM L
Number of Countries: 011 Number of Patents: 008
Patent Family:

| Patent No | Kind | Date | Applicat No | Kind | Date | Week | |
|---|---|---|---|---|---|---|---|
| EP 315610 | A | 19890510 | EP 88850327 | A | 19881004 | 198919 | B |
| SE 8704280 | A | 19890504 | | | | 198925 | |
| SE 459326 | B | 19890626 | | | | 198928 | |
| BR 8805551 | A | 19890711 | | | | 198933 | |
| PT 88894 | A | 19890914 | | | | 198941 | |
| US 4893969 | A | 19900116 | US 88265898 | A | 19881102 | 199010 | |
| CN 1035785 | A | 19890927 | | | | 199030 | |
| CA 1313962 | C | 19930302 | CA 580300 | A | 19881017 | 199314 | |

Priority Applications (No Type Date): SE 874280 A 19871103
Patent Details:

| Patent No | Kind | Lan | Pg | Main IPC | Filing Notes |
|---|---|---|---|---|---|
| EP 315610 | A | E | 8 | | |
| | Designated States (Regional): DE ES FR GB IT SE | | | | |
| US 4893969 | A | | 9 | | |
| CA 1313962 | C | | | B26D-001/00 | |

Cutting **insert for chip removing** machining - ...

...**has rake face and clearance face forming** cutting **edge with ridges on rake face connected to** cutting **edge**
...Inventor: **HESSMAN I**

...Abstract (Basic): A polygonal indexable **cutting** insert (10) has a **cutting** edge (15) formed by a clearance face (13) and a rake face (16A) at their...

...The rake face carries an elongated first ridge (14) connected to the **cutting** edge, and up to a further nine similar ridges such as (17) arranged below the...

...USE/ADVANTAGE - For chip removing **machining** , pref. **milling** . Gives maximum life with small **cutting** forces as the insert compensates for wear...
...Abstract (Equivalent): The **cutting** insert includes a rake face and a clearance face. A **cutting** edge is arranged at the line of intersection of those faces. The rake face comprises at least two adjacent, elongated ridges which extend along at least a part of the **cutting** edge...

...A first ridge connects to the **cutting** edge. A second of the ridges is arranged to become active after wear of the...
...Title Terms: **MACHINING** ;

**5/3,K/13 (Item 11 from file: 350)**
DIALOG(R)File 350:Derwent WPIX


007867037
WPI Acc No: 1989-132149/198918
XRPX Acc No: N89-100642
**Indexable** cutting **insert for cast iron engine blocks - has positive** cutting **geometry providing clean peripheral cut.**
Patent Assignee: SANDVIK AB (SANV )
Inventor: HESSMAN A B I; NYSTROEM L R; **HESSMAN I** ; NYSTROM L
Number of Countries: 011 Number of Patents: 010
Patent Family:

| Patent No | Kind | Date | Applicat No | Kind | Date | Week | |
|---|---|---|---|---|---|---|---|
| EP 314647 | A | 19890503 | EP 88850321 | A | 19880926 | 198918 | B |
| SE 8704153 | A | 19890427 | | | | 198924 | |
| SE 459237 | B | 19890619 | | | | 198927 | |
| BR 8805508 | A | 19890704 | | | | 198932 | |
| PT 88865 | A | 19890731 | | | | 198935 | |
| CN 1032756 | A | 19890510 | | | | 199017 | |
| US 5032049 | A | 19910716 | US 88262744 | A | 19881026 | 199131 | |
| CA 1299852 | C | 19920505 | CA 578969 | A | 19880930 | 199223 | |
| EP 314647 | B1 | 19940302 | EP 88850321 | A | 19880926 | 199409 | |
| DE 3888087 | G | 19940407 | DE 3888087 | A | 19880926 | 199415 | |
| | | | EP 88850321 | A | 19880926 | | |

Priority Applications (No Type Date): SE 874153 A 19871026
Patent Details:

| Patent No | Kind | Lan | Pg | Main IPC | Filing Notes |
|---|---|---|---|---|---|
| EP 314647 | A | E | 8 | | |
| Designated States (Regional): DE ES FR GB IT SE | | | | | |
| EP 314647 | B1 | E | 9 | B23B-027/14 | |

Designated States (Regional): DE ES FR GB IT SE
DE 3888087 G B23B-027/14 Based on patent EP 314647
CA 1299852 C B23B-027/14

**Indexable** cutting **insert for cast iron engine blocks...**

...**has positive** cutting **geometry providing clean peripheral cut.**
...Inventor: **HESSMAN I**

...Abstract (Basic): An indexable **cutting** insert is secured at the periphery of a **milling** cutter for cast iron engine blocks. The insert has an upper surface (11A) and four...

...meet at rounded corners (14). These corners (14) have a relatively large radius, spreading the **cutting** forces more widely when **machining** the edges of the workpiece...

...connecting the side surfaces is wider at the corners (14) than between the corners. The **cutting** edge (19) is parallel with the upper surface at the corners (14) but slopes afterwards when it forms an acute angle with the upper surface (11A), providing positive **cutting** geometry...
...Abstract (Equivalent): Face- **milling** cutter including a cutter body having at least one **cutting** insert pocket positioned at a peripheral part thereof, and being adapted for axial rotation with respect to a work piece, and an indexable **cutting** insert (10) comprising a substantially square-shaped body having an upper surface (11), a lower ...

...in a corner, a peripheral land (18) connecting to said surfaces and forming a peripheral **cutting** edge (40), said land (18) further at least partly connecting to a downwardly and inwardly...

...spaced outwardly of a straight imaginary line between points of intersection of bisectors and the **cutting** edge at two adjacent corners...
...Abstract (Equivalent): The indexable **cutting** insert is for face **milling** of engine blocks of cast iron. The insert has a free surface and a clearance surface and a **cutting** edge extending peripherally about the insert...

...have a relatively large radius and the setting angle is close to zero degrees during **machining** of the engine block when the insert gets close to the border line of the...

...and the clearance surface enclose an acute angle and therefore the insert has a positive **cutting** geometry. A land is provided between the free surface and the **cutting** edge. The land has a width increasing towards each insert corner...

**5/3,K/14 (Item 12 from file: 350)**
DIALOG(R)File 350:Derwent WPIX


004020919
WPI Acc No: 1984-166461/198427
XRPX Acc No: N84-123896
Cutting **insert for slot** milling **tool - has recesses in** cutting **corners behind** cutting **edges in wear direction**
Patent Assignee: SANTRADE LTD (SANV )

Inventor: **HESSMAN I** ; NORGREN L; POST Y
Number of Countries: 006 Number of Patents: 006
Patent Family:

| Patent No | Kind | Date | Applicat No | Kind | Date | Week | |
|---|---|---|---|---|---|---|---|
| EP 112806 | A | 19840704 | EP 83850305 | A | 19831111 | 198427 | B |
| SE 8207421 | A | 19840730 | | | | 198433 | |
| EP 112806 | B | 19860723 | | | | 198630 | |
| DE 3364760 | G | 19860828 | | | | 198636 | |
| SE 450350 | B | 19870622 | | | | 198727 | |
| US 5004380 | A | 19910402 | US 8771918 | A | 19870710 | 199116 | |

Priority Applications (No Type Date): SE 827421 A 19821227
Patent Details:

| Patent No | Kind | Lan | Pg | Main IPC | Filing Notes |
|---|---|---|---|---|---|
| EP 112806 | A | E | 9 | | |
| Designated States (Regional): DE FR GB IT | | | | | |
| EP 112806 | B | E | | | |
| Designated States (Regional): DE FR GB IT | | | | | |

Cutting **insert for slot** milling **tool**...

...**has recesses in** cutting **corners behind** cutting **edges in wear direction**
Inventor: **HESSMAN I** ...

...Abstract (Basic): An insert is basically parallelepipedal with two sides and four end surfaces, a **cutting** edge at the junction between adjacent end surfaces, and second **cutting** edges between sides and an end surface provided with a chip surface. A recess is formed at a side behind the adjacent second **cutting** edge in the wear direction of the insert...

...The recess emerges into the end surface behind the first **cutting** edge in the wear direction so that the second **cutting** edge and adjacent recess form a narrow flange in the side to limit flank wear extension. The second **cutting** edge length is pref. no more than four times flange width, and the recess is...

...Abstract (Equivalent): **Cutting** insert for a slot milling tool, whose basic form is a parallelepiped, comprising two opposed side surfaces (13), and four end surfaces (14) extending therebetween, a first **cutting** edge (15) provided at or near the line or juncture between adjacent end surfaces (14), second **cutting** edges (16) that are defined by the lines of juncture between the side surfaces (13...

...surfaces at each corner (12), said means (19) being located behind each of said second **cutting** edges (16) in the direction of wear and...

...respective end surface, and narrow flanges (23) separating said means (19) from each respective second **cutting** edge (16), and in that each of the second...

... **cutting** edges (16) is perpendicular to an adjacent first **cutting** edge (15

...Abstract (Equivalent): The replaceable slot- **cutting** **milling** insert has the configuration of a parallelpiped with two parallel side surfaces and four end surfaces extending therebetween to define four corners. Each corner comprises a major **cutting** edge provided at the juncture between two adjacent end surfaces and perpendicular to the side surfaces. Two minor **cutting** edges are defined by the lines of juncture between the side surfaces and one end surface. Each of the

minor cuttin.. **cutting** edges is perpendicular to an adjacent major **cutting** edge...

...A concave chip receiving surface in the end durface is adjacent each of said **cutting** edges. The side surfaces have a direction of wear, and member for reducing wear in...

...at each corner comprising recess in the side surfaces located behind each of the minor **cutting** edges in the direction of wear and a narrow flange separating each recess from its associated minor **cutting** edge ...

...USE - For a rotary slot **milling** tool. (5pp)

```
Set     Items   Description
S1        663   AU='DAHL'
S2          2   AU='DAHL KATARINA'
S3         16   AU='HESSMAN':AU='HESSMAN INGEMAR'
S4         52   S1:S3 AND (MILLING OR MACHINING OR CUTTING)
S5          0   S4 AND (SILIC?(5N)NITRIDE?)
? show files
File 348:EUROPEAN PATENTS 1978-2004/Jan W02
         (c) 2004 European Patent Office
File 349:PCT FULLTEXT 1979-2002/UB=20031225,UT=20031218
         (c) 2003 WIPO/Univentio
? pause
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**4/3,AU/2 (Item 2 from file: 348)**
DIALOG(R)File 348:EUROPEAN PATENTS


01459235
**Tool for turning of titanium alloys**
**Werkzeug zur Drehbearbeitung von Titanlegierungen**
**Outil de tournage d'alliages de titane**
PATENT ASSIGNEE:
SANDVIK AKTIEBOLAG, (300829), , 811 81 Sandviken, (SE), (Applicant designated States: all)
INVENTOR:
**Hessman** , Ingemar, Silverslingan 19, 811 54 Sandviken, (SE)
Olsson, Bjorn, Malmvagen 53, 141 71 Huddinge, (SE)
Petersson, Carl-Goran, Flintstensvagen 26, 437 32 Lindome, (SE
LEGAL REPRESENTATIVE:
Taquist, Lennart et al (39464), Sandvik AB Patent Department, 811 81 SANDVIKEN, (SE)
PATENT (CC, No, Kind, Date): EP 1247879 A2 021009 (Basic)
EP 1247879 A3 030108
APPLICATION (CC, No, Date): EP 2002007465 020330;
PRIORITY (CC, No, Date): SE 011241 010405
DESIGNATED STATES: AT; BE; CH; CY; DE; DK; ES; FI; FR; GB; GR; IE; IT; LI; LU; MC; NL; PT; SE; TR
EXTENDED DESIGNATED STATES: AL; LT; LV; MK; RO; SI
INTERNATIONAL PATENT CLASS: C23C-030/00; B23B-027/14
LANGUAGE (Publication,Procedural,Application): English; English; English
FULLTEXT AVAILABILITY:

| Available Text | Language | Update | Word Count |
|---|---|---|---|
| CLAIMS A | (English) | 200241 | 176 |
| SPEC A | (English) | 200241 | 759 |
| Total word count - document A | | | 935 |
| Total word count - document B | | | 0 |
| Total word count - documents A + B | | | 935 |

**4/3,AU/4 (Item 4 from file: 348)**
DIALOG(R)File 348:EUROPEAN PATENTS


01429427
**Coated inserts for rough milling**
**Beschichteter Einsatz zum Schruppen**
**Plaquette revetue pour degrossisage**
PATENT ASSIGNEE:
SANDVIK AKTIEBOLAG, (300829), , 811 81 Sandviken, (SE), (Applicant designated States: all)
INVENTOR:
Nordgren, Anders, G:a Tyresovagen 395, 12134 Enskededalen, (SE)
Mikus, Marian, Algrytevagen 226, 12730 Skarholmen, (SE)
**Hessman** , Ingemar, Silverslingan 19, 81152 Sandviken, (SE
LEGAL REPRESENTATIVE:
Taquist, Lennart et al (39464), Sandvik AB Patent Department, 811 81 SANDVIKEN, (SE)
PATENT (CC, No, Kind, Date): EP 1205569 A2 020515 (Basic)
APPLICATION (CC, No, Date): EP 2001850176 011025;
PRIORITY (CC, No, Date): SE 004079 001108
DESIGNATED STATES: AT; BE; CH; CY; DE; DK; ES; FI; FR; GB; GR; IE; IT; LI; LU; MC; NL; PT; SE; TR
EXTENDED DESIGNATED STATES: AL; LT; LV; MK; RO; SI
INTERNATIONAL PATENT CLASS: C22C-029/08; C23C-030/00
ABSTRACT WORD COUNT: 98
LANGUAGE (Publication,Procedural,Application): English; English; English
FULLTEXT AVAILABILITY:

| Available Text | Language | Update | Word Count |
|---|---|---|---|
| CLAIMS A | (English) | 200220 | 451 |
| SPEC A | (English) | 200220 | 2636 |
| Total word count - document A | | | 3087 |
| Total word count - document B | | | 0 |
| Total word count - documents A + B | | | 3087 |

**4/3,AU/6 (Item 6 from file: 348)**
DIALOG(R)File 348:EUROPEAN PATENTS


01253188
**LOADING SYSTEM FOR PVD COATING OF CUTTING INSERTS**
**LADUNGSSYSTEM FUR PVD-BESCHICHTUNG VON SCHNEIDEINSATZEN**
**SYSTEME DE CHARGEMENT DE PLAQUETTES DE COUPE DESTINEES A RECEVOIR UN REVETEMENT PAR COUCHAGE PAR METAL DUR (PVD)**
PATENT ASSIGNEE:
Sandvik Aktiebolag (publ), (2351320), , 811 81 Sandviken, (SE),
(Applicant designated States: all)
INVENTOR:
NORRGRANN, Tor, Dalkarlsvagen 27, S-141 40 Huddinge, (SE)
**HESSMAN** , Ingemar, Silverslingan 19, S-811 52 Sandviken, (SE
LEGAL REPRESENTATIVE:
Taquist, Lennart (39461), Sandvik AB Patents & Licences Fack, 811 81 Sandviken 1, (SE)
PATENT (CC, No, Kind, Date): EP 1203105 A1 020508 (Basic)
WO 200102620 010111
APPLICATION (CC, No, Date): EP 2000946702 000704; WO 2000SE1416 000704
PRIORITY (CC, No, Date): SE 992574 990705
DESIGNATED STATES: AT; BE; CH; CY; DE; DK; ES; FI; FR; GB; GR; IE; IT; LI; LU; MC; NL; PT; SE
EXTENDED DESIGNATED STATES: AL; LT; LV; MK; RO; SI
INTERNATIONAL PATENT CLASS: C23C-002/00
NOTE:
No A-document published by EPO
LANGUAGE (Publication,Procedural,Application): English; English; English

**4/3,AU/13 (Item 13 from file: 348)**
DIALOG(R)File 348:EUROPEAN PATENTS


00731432
**FACE MILLING CUTTER WITH RECESSES FOR ADJUSTABLE INSERT HOLDERS**
**FRASER MIT AUSNEHMUNGEN FUR EINSTELLBARE EINSATZHALTER**
**FRAISE DE SURFACE COMPRENANT DES EVIDEMENETS DESTINES A DES SUPPORTS D'ELEMENTS RAPPORTES REGLABLES**
PATENT ASSIGNEE:
SANDVIK AKTIEBOLAG, (300829), , 811 81 Sandviken, (SE), (applicant designated states: AT;BE;CH;DE;DK;ES;FR;GB;IE;IT;LI;LU;NL;PT;SE)
INVENTOR:
**HESSMAN** , Ingemar, Silverslingan 19, S-811 52 Sandviken, (SE)
ALMERSAND, Ake, Nedre Vagen 16, S-810 22 Arsunda, (SE
PATENT (CC, No, Kind, Date): EP 689489 A1 960103 (Basic)
EP 689489 B1 980513
WO 9421411 940929
APPLICATION (CC, No, Date): EP 94911347 940318; WO 94SE245 940318
PRIORITY (CC, No, Date): SE 93888 930318
DESIGNATED STATES: AT; BE; CH; DE; DK; ES; FR; GB; IE; IT; LI; LU; NL; PT; SE
INTERNATIONAL PATENT CLASS: B23C-005/06; B23C-005/24;
NOTE:
No A-document published by EPO
LANGUAGE (Publication,Procedural,Application): English; English; Swedish
FULLTEXT AVAILABILITY:

| Available Text | Language | Update | Word Count |
|---|---|---|---|
| CLAIMS B | (English) | 9820 | 428 |
| CLAIMS B | (German) | 9820 | 390 |
| CLAIMS B | (French) | 9820 | 476 |
| SPEC B | (English) | 9820 | 2602 |
| Total word count - document A | | | 0 |
| Total word count - document B | | | 3896 |
| Total word count - documents A + B | | | 3896 |

**4/3,AU/15 (Item 15 from file: 348)**
DIALOG(R)File 348:EUROPEAN PATENTS


00713547
**INDEXABLE INSERT FOR FINISH MILLING AND CUTTER BODY THEREFOR**
**INDEXIERBARER FRASEINSATZ UND FRASKOPF DAFUR**
**PLAQUETTE INDEXABLE POUR FINISSAGE A LA FRAISE ET FRAISE APPROPRIEE**
PATENT ASSIGNEE:
SANDVIK AKTIEBOLAG, (300829), , 811 81 Sandviken, (SE), (applicant designated states: DE;FR;GB;IT)
INVENTOR:
**HESSMAN** , Ingemar, Silverslingan 19, S-811 52 Sandviken, (SE)
ROMAN, Stefan, Lassasvagen 26, S-811 62 Sandviken, (SE
PATENT (CC, No, Kind, Date): EP 739258 A1 961030 (Basic)
EP 739258 B1 980603
WO 9519238 950720
APPLICATION (CC, No, Date): EP 95907174 950113; WO 95SE33 950113
PRIORITY (CC, No, Date): SE 9481 940114; SE 942983 940906
DESIGNATED STATES: DE; FR; GB; IT
INTERNATIONAL PATENT CLASS: B23C-005/20; B23B-027/16
NOTE:
No A-document published by EPO
LANGUAGE (Publication,Procedural,Application): English; English; Swedish
FULLTEXT AVAILABILITY:

| Available Text | Language | Update | Word Count |
|---|---|---|---|
| CLAIMS B | (English) | 9823 | 589 |
| CLAIMS B | (German) | 9823 | 524 |
| CLAIMS B | (French) | 9823 | 656 |
| SPEC B | (English) | 9823 | 2663 |
| Total word count - document A | | | 0 |
| Total word count - document B | | | 4432 |
| Total word count - documents A + B | | | 4432 |

**4/3,AU/18 (Item 18 from file: 348)**
DIALOG(R)File 348:EUROPEAN PATENTS


00646819
Milling **cutter body.**
**Fraskorper.**
**Corps de fraise.**
PATENT ASSIGNEE:
SANDVIK AKTIEBOLAG, (300829), , S-811 81 Sandviken 1, (SE), (applicant designated states: AT;BE;CH;DE;DK;ES;FR;GB;IE;IT;LI;LU;NL;PT;SE)
INVENTOR:
**Hessman**, Ingemar, Silverslingan 19, S-811 52 Sandviken, (SE)
Almersand, Ake, Nedre Vagen 16, S-810 22 Arsunda, (SE
PATENT (CC, No, Kind, Date): EP 624415 A1 941117 (Basic)
APPLICATION (CC, No, Date): EP 94850032 940228;
PRIORITY (CC, No, Date): SE 93889 930318
DESIGNATED STATES: AT; BE; CH; DE; DK; ES; FR; GB; IE; IT; LI; LU; NL; PT; SE
INTERNATIONAL PATENT CLASS: B23C-005/00; B23C-005/22; B23C-005/24;
ABSTRACT WORD COUNT: 77
LANGUAGE (Publication,Procedural,Application): English; English; Swedish
FULLTEXT AVAILABILITY:

| Available Text | Language | Update | Word Count |
|---|---|---|---|
| CLAIMS A | (English) | EPABF2 | 387 |
| SPEC A | (English) | EPABF2 | 1545 |
| Total word count - document A | | | 1932 |
| Total word count - document B | | | 0 |
| Total word count - documents A + B | | | 1932 |

**4/3,AU/23 (Item 23 from file: 348)**
DIALOG(R)File 348:EUROPEAN PATENTS


00380151
Milling **cutter.**
**Fraswerkzeug.**
**Fraise.**
PATENT ASSIGNEE:
SANDVIK AKTIEBOLAG, (300829), , S-811 81 Sandviken 1, (SE), (applicant designated states: DE;ES;FR;GB;IT;SE)
INVENTOR:
**Hessman** , Ingemar, Silverslingan 19, S-811 52 Sandviken, (SE)
Nystrom, Leif, Rotevagen 1, S-810 28 Jarbo, (SE
LEGAL REPRESENTATIVE:
Taquist, Lennart et al (39461), Sandvik AB Patents & Licences Fack, S-811 81 Sandviken 1, (SE)
PATENT (CC, No, Kind, Date): EP 332596 A2 890913 (Basic)
EP 332596 A3 900905
EP 332596 B1 920819
APPLICATION (CC, No, Date): EP 89850059 890221;
PRIORITY (CC, No, Date): SE 88873 880311
DESIGNATED STATES: DE; ES; FR; GB; IT; SE
INTERNATIONAL PATENT CLASS: B23C-005/24;
ABSTRACT WORD COUNT: 113
LANGUAGE (Publication,Procedural,Application): English; English; English
FULLTEXT AVAILABILITY:

| Available Text | Language | Update | Word Count |
|---|---|---|---|
| CLAIMS B | (English) | EPBBF1 | 1744 |
| CLAIMS B | (German) | EPBBF1 | 953 |
| CLAIMS B | (French) | EPBBF1 | 1063 |
| SPEC B | (English) | EPBBF1 | 2928 |
| Total word count - document A | | | 0 |
| Total word count - document B | | | 6688 |
| Total word count - documents A + B | | | 6688 |

**4/3,AU/24 (Item 24 from file: 348)**
DIALOG(R)File 348:EUROPEAN PATENTS


00326933
Cutting **insert and method for chip removing** machining .
**Schneideinsatz und spanabhebende Bearbeitungsmethode.**
**Plaquette de coupe et methode d'usinage par enlevement de copeaux.**
PATENT ASSIGNEE:
SANDVIK AKTIEBOLAG, (300829), , S-811 81 Sandviken 1, (SE), (applicant designated states: DE;ES;FR;GB;IT;SE)
INVENTOR:
**Hessman** , Ingemar, Silverslingan 19, S-811 52 Sandviken, (SE)
Nystrom, Leif, Rotevagen 1, S-810 28 Jarbo, (SE
LEGAL REPRESENTATIVE:
Taquist, Lennart et al (39461), Sandvik AB Patents & Licences Fack, S-811 81 Sandviken 1, (SE)
PATENT (CC, No, Kind, Date): EP 315610 A2 890510 (Basic)
EP 315610 A3 891018
APPLICATION (CC, No, Date): EP 88850327 881004;
PRIORITY (CC, No, Date): SE 874280 871103
DESIGNATED STATES: DE; ES; FR; GB; IT; SE
INTERNATIONAL PATENT CLASS: B23C-005/20;
ABSTRACT WORD COUNT: 115
LANGUAGE (Publication,Procedural,Application): English; English; English
FULLTEXT AVAILABILITY:

| Available Text | Language | Update | Word Count |
|---|---|---|---|
| CLAIMS A | (English) | EPABF1 | 648 |
| SPEC A | (English) | EPABF1 | 1683 |
| Total word count - document A | | | 2331 |
| Total word count - document B | | | 0 |
| Total word count - documents A + B | | | 2331 |

**4/3,AU/25 (Item 25 from file: 348)**
DIALOG(R)File 348:EUROPEAN PATENTS


00326927
**Face-** milling **cutter.**
**Stirnfraser.**
**Fraise a surfacer.**
PATENT ASSIGNEE:
SANDVIK AKTIEBOLAG, (300829), , S-811 81 Sandviken 1, (SE), (applicant designated states: DE;ES;FR;GB;IT;SE)
INVENTOR:
**Hessman** , Ingemar, Silverslingan 19, S-811 52 Sandviken, (SE)
Nystrom, Leif, Rotevagen 1, S-810 28 Jarbo, (SE
PATENT (CC, No, Kind, Date): EP 314647 A2 890503 (Basic)
EP 314647 A3 900711
EP 314647 B1 940302
APPLICATION (CC, No, Date): EP 88850321 880926;
PRIORITY (CC, No, Date): SE 874153 871026
DESIGNATED STATES: DE; ES; FR; GB; IT; SE
INTERNATIONAL PATENT CLASS: B23B-027/14;
ABSTRACT WORD COUNT: 131
LANGUAGE (Publication,Procedural,Application): English; English; English
FULLTEXT AVAILABILITY:

| Available Text | Language | Update | Word Count |
|---|---|---|---|
| CLAIMS B | (English) | EPBBF1 | 362 |
| CLAIMS B | (German) | EPBBF1 | 354 |
| CLAIMS B | (French) | EPBBF1 | 413 |
| SPEC B | (English) | EPBBF1 | 1851 |
| Total word count - document A | | | 0 |
| Total word count - document B | | | 2980 |
| Total word count - documents A + B | | | 2980 |

**4/3,AU/28 (Item 28 from file: 348)**
DIALOG(R)File 348:EUROPEAN PATENTS


00116302
Cutting **insert.**
**Schneidwerkzeug.**
**Outil coupant.**
PATENT ASSIGNEE:
Santrade Ltd., (451371), Alpenquai 12 P.O. Box 321, CH-6002 Luzern, (CH),
(applicant designated states: DE;FR;GB;IT)
INVENTOR:
**Hessman** , Ingemar, Silverslingan 19, S-811 52 Sandviken, (SE)
Post, Yngve, Bronsgatan 6 B, S-811 52 Sandviken, (SE)
Norgren, Lars, Brunnsviksvagen 55 (Box 19), S-810 41 Forsbacka, (SE
LEGAL REPRESENTATIVE:
Taquist, Lennart et al , Sandvik AB Patents & Licences Fack, S-811 81
Sandviken 1, (SE)
PATENT (CC, No, Kind, Date): EP 112806 A1 840704 (Basic)
EP 112806 B1 860723
APPLICATION (CC, No, Date): EP 83850305 831111;
PRIORITY (CC, No, Date): SE 827421 821227
DESIGNATED STATES: DE; FR; GB; IT
INTERNATIONAL PATENT CLASS: B23C-005/20;
ABSTRACT WORD COUNT: 72
LANGUAGE (Publication,Procedural,Application): English; English; English

**4/3,AU/32 (Item 4 from file: 349)**
DIALOG(R)File 349:PCT FULLTEXT


00909512
**METHOD OF** MILLING **ENGINE BLOCKS**
**PROCEDE DE FRAISAGE DE BLOCS-CYLINDRES**
Patent Applicant/Assignee:
SANDVIK AB; (publ), SE-811 81 Sandviken, SE, SE (Residence), SE (Nationality)
Inventor(s):
**DAHL** Katarina, Barrsatra Furuvag 51, S-811 36 Sandviken, SE,
**HESSMAN** Ingemar, Silverslingan 19, S-811 52 Sandviken, SE
Legal Representative:
TAQUIST Lennart (agent), Sandvik AB, Patent Dept, S-811 81 Sandviken, SE,

Patent and Priority Information (Country, Number, Date):
Patent: WO 200242027 A1 20020530 (WO 0242027)
Application: WO 2001SE2532 20011114 (PCT/WO SE0102532)
Priority Application: SE 20004274 20001122
Designated States: IL JP KR
(EP) AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE TR
Publication Language: English
Filing Language: English
Fulltext Word Count: 766

4/3,AU/36 (Item 8 from file: 349)
DIALOG(R)File 349:PCT FULLTEXT


00769136
**LOADING SYSTEM FOR PVD COATING OF CUTTING INSERTS**
**SYSTEME DE CHARGEMENT DE PLAQUETTES DE COUPE DESTINEES A RECEVOIR UN REVETEMENT PAR COUCHAGE PAR METAL DUR (PVD)**

Patent Applicant/Assignee:
SANDVIK AB; (publ), S-811 81 Sandviken, SE, SE (Residence), SE (Nationality), (For all designated states except: US)
Patent Applicant/Inventor:
NORRGRANN Tor, Dalkarlsvagen 27, S-141 40 Huddinge, SE, SE (Residence), SE (Nationality), (Designated only for: US)
**HESSMAN** Ingemar, Silverslingan 19, S-811 52 Sandviken, SE, SE (Residence), SE (Nationality), (Designated only for: US
Legal Representative:
TAQUIST Lennart (agent), Sandvik AB, Patent Dept., S-811 81 Sandviken, SE

Patent and Priority Information (Country, Number, Date):
Patent: WO 200102620 A1 20010111 (WO 0102620)
Application: WO 2000SE1416 20000704 (PCT/WO SE0001416)
Priority Application: SE 992574 19990705
Designated States: IL JP US
(EP) AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE
Publication Language: English
Filing Language: English
Fulltext Word Count: 1879

**4/3,AU/46 (Item 18 from file: 349)**
DIALOG(R)File 349:PCT FULLTEXT


00301087
**INDEXABLE INSERT FOR FINISH MILLING AND CUTTER BODY THEREFOR**
**PLAQUETTE INDEXABLE POUR FINISSAGE A LA FRAISE ET FRAISE APPROPRIEE**
Patent Applicant/Assignee:
SANDVIK AB,
HESSMAN Ingemar,
ROMAN Stefan,
Inventor(s):
**HESSMAN** Ingemar,
ROMAN Stefan
Patent and Priority Information (Country, Number, Date):
Patent: WO 9519238 A1 19950720
Application: WO 95SE33 19950113 (PCT/WO SE9500033)
Priority Application: SE 9481 19940114; SE 942983 19940906
Designated States: CA CN JP KR PL RU US AT BE CH DE DK ES FR GB GR IE IT LU MC NL PT SE
Publication Language: English
Fulltext Word Count: 3674

**4/3,AU/47 (Item 19 from file: 349)**
DIALOG(R)File 349:PCT FULLTEXT


00273235
**FACE MILLING CUTTER WITH RECESSES FOR ADJUSTABLE INSERT HOLDERS**
**FRAISE DE SURFACE COMPRENANT DES EVIDEMENETS DESTINES A DES SUPPORTS D'ELEMENTS RAPPORTES REGLABLES**
Patent Applicant/Assignee:
SANDVIK AB,
HESSMAN Ingemar,
ALMERSAND Ake,
Inventor(s):
**HESSMAN** Ingemar,
ALMERSAND Ake
Patent and Priority Information (Country, Number, Date):
Patent: WO 9421411 A1 19940929
Application: WO 94SE245 19940318 (PCT/WO SE9400245)
Priority Application: SE 93888 19930318
Designated States: AU BR CA CN FI JP KR NO PL RU US AT BE CH DE DK ES FR GB GR IE IT LU MC NL PT SE
Publication Language: English
Fulltext Word Count: 3291

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S6          4   AU='DAHL KV'
S7          0   S1:S6 AND (MILLING OR MACHINING OR CUTTING)
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File  94:JICST-EPlus 1985-2004/Jan W1
         (c)2004 Japan Science and Tech Corp(JST)
File  95:TEME-Technology & Management 1989-2004/Dec W4
         (c) 2004 FIZ TECHNIK
File  99:Wilson Appl. Sci & Tech Abs 1983-2003/Nov
         (c) 2003 The HW Wilson Co.
File  35:Dissertation Abs Online 1861-2004/Dec
         (c) 2004 ProQuest Info&Learning
File 111:TGG Natl.Newspaper Index(SM) 1979-2004/Jan 13
         (c) 2004 The Gale Group
File 583:Gale Group Globalbase(TM) 1986-2002/Dec 13
         (c) 2002 The Gale Group
File   6:NTIS 1964-2004/Jan W2
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File   2:INSPEC 1969-2004/Jan W1
         (c) 2004 Institution of Electrical Engineers
File   8:Ei Compendex(R) 1970-2004/Jan W1
         (c) 2004 Elsevier Eng.  Info. Inc.
File  34:SciSearch(R) Cited Ref Sci 1990-2004/Jan W1
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File 434:SciSearch(R) Cited Ref Sci 1974-1989/Dec
         (c) 1998 Inst for Sci Info
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         (c) 2004 BLDSC all rts. reserv.
File 473:FINANCIAL TIMES ABSTRACTS 1998-2001/APR 02
         (c) 2001 THE NEW YORK TIMES
File 474:New York Times Abs 1969-2004/Jan 13
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File 475:Wall Street Journal Abs 1973-2004/Jan 13
         (c) 2004 The New York Times
File 481:DELPHES Eur Bus 95-2004/Dec W3
         (c) 2004 ACFCI & Chambre CommInd Paris
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File  25:Weldasearch 1966-2002/Jul
         (c) 2004 TWI Ltd
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E12        1  AU=HESSMANN, MARTIN

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(c) 2004 Consumer Union
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(c) 2001 Bridge
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File 810:Business Wire 1986-1999/Feb 28
(c) 1999 Business Wire
File 813:PR Newswire 1987-1999/Apr 30
(c) 1999 PR Newswire Association Inc
File 20:Dialog Global Reporter 1997-2004/Jan 14
(c) 2004 The Dialog Corp.
File 570:Gale Group MARS(R) 1984-2004/Jan 14
(c) 2004 The Gale Group
File 476:Financial Times Fulltext 1982-2004/Jan 14
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File 477:Irish Times 1999-2004/Jan 14
(c) 2004 Irish Times
File 710:Times/Sun.Times(London) Jun 1988-2004/Jan 13
(c) 2004 Times Newspapers
File 711:Independent(London) Sep 1988-2004/Jan 14
(c) 2004 Newspaper Publ. PLC
File 756:Daily/Sunday Telegraph 2000-2004/Jan 14
(c) 2004 Telegraph Group
File 757:Mirror Publications/Independent Newspapers 2000-2004/Jan 14
(c) 2004